IMSA Sustainable Landscape Plan

"The Greening of IMSA"

June 30, 2011

Prepared for:
Illinois Math and Science Acadamy
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Established in 1986, the IMSA Fund for Advancement of Education is a 501(c)(3) not-for-profit corporation that accepts and distributes gifts and grants from the private sector to support IMSA's mission and work. These contributions support programs and services for IMSA students and staff, other Illinois students, and educators in Illinois and beyond; activities for IMSA alumni and parents; and IMSA Fund operations including donor cultivation and recognition.

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IMSA Fund for Advancement of Education
Illinois Mathematics and Science Academy
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Background

ABOUT IMSA…

Established by the State of Illinois to develop talent and leadership in science, technology, engineering and mathematics (STEM), the Illinois Mathematics and Science Academy (IMSA) has become an internationally recognized world-class powerhouse for inspiring, challenging and nurturing talented students who use their exceptional abilities to improve people's lives. IMSA's advanced residential college preparatory program enables academically talented Illinois students in grades 10 through 12 to reach extraordinary levels of achievement. IMSA is governed by an appointed Board of Trustees and is funded by the Illinois legislature under the Illinois Board of Higher Education appropriation.

As a resource for the people of Illinois, the Academy serves thousands of teachers and students throughout Illinois and across the country. The Academy's statewide programs ensure that young students, particularly the underserved, have opportunities to excel in mathematics and science.

The Academy also works with educational, business, government and entrepreneurial partners to develop, test and share innovative ways to enhance teaching and learning in science, technology, engineering and mathematics.

IMSA'S MISSION…

The mission of IMSA, the world's leading teaching and learning laboratory for imagination and inquiry, is to ignite and nurture creative, ethical scientific minds that advance the human condition, through a system distinguished by profound questions, collaborative relationships, personalized experiential learning, global networking, generative use of technology and pioneering outreach.

IMSA'S BELIEFS…

We believe that:

- All people have equal intrinsic worth.
- All people have choices and are responsible for their actions.
- Belonging to a community requires commitment to the common good.
- Diverse perspectives enrich understanding and inspire discovery and creativity.
- Honesty, trust and respect are vital for any relationship to thrive.
- Learning never ends.
- Meaning is constructed by the learner.
- No one's path in life is predetermined.
- The ability to discern and create connections is the essence of knowing.
- We are all stewards of our planet.

IMSA's HISTORY…

Lead by the efforts of Dr. Leon Lederman and Governor James R. Thompson, IMSA was established in 1985 by the Illinois General Assembly as part of the State's comprehensive educational reform package to "offer a uniquely challenging education for students talented in the areas of mathematics and science" and "serve the school system of the State as a catalyst and laboratory for the advancement of teaching. The Academy opened in 1986 and in 1993 IMSA's identity evolved from "school" to "educational laboratory," resulting in an increase in research and statewide service programs. "Go Green @ IMSA" was founded in 2006 by the students and faculty of IMSA to make the campus more environmentally aware. In 2007 a new strategic plan charts a bold course for IMSA's third decade, including the mission "to ignite and nurture creative, ethical scientific minds that advance the human condition." IMSA expanded in 2009, opening Field Offices in Chicago and Metro East to expand programs and services for educators and students in these communities.

PROJECT HISTORY…

The "Greening of IMSA's Campus" project began in 2006 after students and faculty of IMSA formalized an environmental movement on campus called "Go Green @ IMSA" along with the establishment of the student-led "Club Verno", an IMSA Environmental Club whose goal is to increase environmental awareness, respond to environmental issues, and plan related programs and activities.

Go Green @ IMSA also established the following "Action Steps":

1. Model, as an academy, effective stewardship of the environment:
   - Develop or adopt sustainability standards.
   - Review purchasing processes regarding use of sustainable products.
   - Implement necessary sustainability processes.
   - Develop and implement programs that focus on energy and water conservation.
   - Report to the community the actions being taken and the anticipated energy savings.
   - Report to the community on amounts recycled and projected energy/environmental impact.
2. Create opportunities for individual environmental stewardship within the IMSA community:
   - Implement a comprehensive recycling program that considers collection and redistribution in a user-friendly manner.
   - Create an education program focused on being stewards of the planet and lessening human impact on the environment.
   - Establish an "environmental tips center" which collects and distributes information (such as ways to reduce, reuse, and recycle various items).
3. Create appropriate green spaces inside the main building and residence halls.
4. Develop an outdoor classroom that would enable study and research.

The IMSA Sustainable Landscape Plan project was ignited mainly by faculty and staff as it became increasingly clear the enormous potential that the IMSA campus provides in:

- Moving the Academy forward with its mission and stated beliefs, particularly "We are all stewards of our planet."
- Promoting the Go Green movement's goals of acting as good stewards of the environment and moving the curriculum to emphasize environmental topics and projects, while helping to meet stated Action Steps 1a, 1c, 1d, 2b and 4.
- Achieving functional goals of the facility, such as: reducing landscape maintenance costs, increasing unprogrammed non-classroom recreational opportunities for students, and helping to solve existing stormwater drainage issues on campus.

In May of 2011, the IMSA Fund for Advancement of Education contracted with a professional ecological planning firm to develop this document in order to provide a basis for securing future funding for implementation of the ideas, goals and plans established herein. A secondary purpose of this document is to provide a foundational design and act as a guideline as funding is secured and construction design is conducted in preparation for implementation.

Goals & Objectives

The goals and objectives for this project were developed through input by faculty and staff through a series of meetings, presentations, site walks, and brain-storming sessions. Some goals and/or objectives are inherently tied to one another, for example the Promote Sustainability goal is closely aligned with the Reduce Landscape Maintenance Costs.

Goal #1

Promote Sustainability: In ecology, the word describes how biological systems remain diverse and productive over time. Long-lived and healthy wetlands and forests are examples of sustainable biological systems. For humans, sustainability is the potential for long-term maintenance of well-being, which has environmental, economic, and social dimensions.

Objectives

•Reduce the burning of fossil fuels by decreasing the amount of lawn that requires frequent mowing
•Reduce the amount of chemicals used in landscape maintenance by decreasing the amount of existing lawn and by converting traditional high-maintenance, non-native ornamental plants with low-maintenance native plants.
•Increase the campus' ability to sequester Carbon Dioxide by restoring deep-rooted native vegetation
•Collect, filter and cool on-site stormwater through naturalized stormwater facilities (such as bioswales, rain gardens, wetlands, etc.)

Goal #2

Enhance the Learning Experience at IMSA: By enhancing the outdoor learning environment at IMSA we aim to diversify and increase teaching methods that are available to IMSA faculty. Teachers implementing innovative teaching methods and diversifying their teaching regime with outdoor activity will be able to better avoid stagnation in their curriculum, which may cultivate new levels of student interest and learning.

Objectives

•Provide multiple outdoor "classrooms" throughout the campus to be utilized by all academic programs
•Provide ample hands-on research opportunities for the science program
•Provide a variety of restored ecosystems/habitats that can be utilized for various hands-on field studies by the science program
•Provide interpretive signage throughout restored natural areas to allow for passive education

Goal #3

Enhance Student Life at IMSA – By enhancing student life at IMSA we aim to increase IMSA's attractiveness to prospective students, while increasing outdoor opportunities for students to decompress through unprogrammed recreation and social engagement in all seasons. Providing ample opportunities for unprogrammed recreation and social engagement may help to relieve the stresses of an intense advanced curriculum and increase student focus during classroom instruction.

Objectives

•Provide hard-surface trail "loops" throughout campus to promote walking, running, biking and other trail activities
•Provide multiple outdoor gathering spaces at various scales to promote social engagement and deter malicious/unwanted use of inappropriate facilities for social gathering, such as baseball dugouts
•Provide small scale outdoor spaces for use in independent study and/or quiet reflection
•Provide alternative and impromptu recreational opportunities that encourage "creative play"
during winter, which constitutes the bulk of the school year

Goal #4

Reduce Landscape Maintenance Costs – By implementing ecological restoration and the use of native plants in the landscape, long-term maintenance costs will be reduced. Alternatively, landscape maintenance dollars saved can be re-allocated to allow existing maintenance crews to concentrate their efforts on high-use, high-visibility areas rather than on the maintenance of large expanses of turf grass that offer no practical use. Any landscape modifications must be made with the understanding that IMSA is a high-level educational institution and aesthetics must be maintained at appropriate levels.

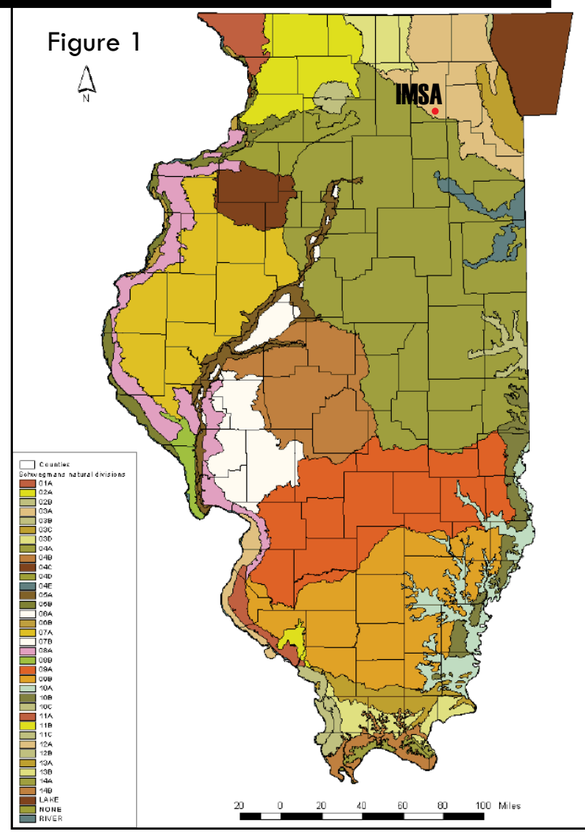
Objectives

•Identify areas of turf grass on campus that offer no practical use and convert them to low-maintenance natural areas
•Begin to transition existing "formal" landscape areas that contain high-maintenance, non-native plants to low-maintenance native plants
•Relieve stormwater/flooding issues that exist on campus sports fields by implementing innovative stormwater facilities that should be aimed at increasing drainage of existing sports fields

Historical Site Ecology

Originally, Aurora was home to a village of 500 Potawatomi Native Americans, who traded peacefully with white settlers in the area. In 1834, Joseph and Samuel McCarty came west from New York to look for a site to build a sawmill, and they found the Fox River. An island at a bend in the river provided a great location to establish mills and factories where water power could be harnessed. At first, there were two separate settlements on either side of the river, but they merged in 1857 to form the town of Aurora. Aurora quickly developed into a manufacturing town, first known for textiles and later for heavy machinery, foundries, and machine shops. The Chicago, Burlington & Quincy Railroad extended its line to Aurora in 1849. Soon after, the railroad became the area's largest employer, locating its repair and railcar construction shops there. The repair shop necessitated the building of a roundhouse, the largest stone roundhouse constructed in the country. The railroad was the largest employer until the 1960s
(City of Aurora, IL).

Figure 1



Illinois Natural History: Four glacial advances occurred over what is now Illinois: the Nebraskan, Kansan, Illinoian, and Wisconsinan glacial epochs. At the end of the last North American glaciation 10,000 – 20,000 years ago, the massive ice sheet known as the Wisconsinan glacier slowly receded from the Midwest. As the ice retreated to the north and east, flowing water and sediment that was released from the melting ice created the diverse landscape of plains, stream beds, wetlands, and moraines (hills of outwash sediment) that now characterizes the Northeastern Morainal Division of Illinois, in which IMSA is located (Department of Natural Resources). This range of topography, hydrology, and microclimate, combined with periodic natural events such as floods and wildfire resulted in the evolution of a rich diversity of flora and fauna that comprised Illinois' ecosystems.

According to Mohlenbrock in Guide to the Vascular Flora of Illinois, 60% of the pre-settlement vegetation in the Northeastern Morainal Division [Figure 1] was prairie [Figure 3]. Generally classified into dry, mesic, wet, and sand, the prairie was an ecosystem of tall grasses, such as big and little bluestem, hardy forbs, and a few fire-tolerant shrubs. Wildfire frequented the prairie, recycling mineral and organic matter, stimulating plant growth, and keeping woody vegetation at bay.

The Oak-Hickory savanna [Figure 4] was also a prominent ecosystem in the region. Often found on the fringes of prairies or along native streams, the savanna was characterized by widely-spaced, large, open-grown bur or white oak with a rich understory of grasses and wildflowers and occasional colonies of shrubs. Like the prairies, savannas were also frequented by fires that swept through the understory, sustaining their open, park-like appearance. Often in the savanna understory, small saplings of oaks or hickories, called grubs, could be found. These grubs were top-killed regularly by fire, but re-sprouted and maintained a low profile in the savanna. However, with the anthropogenic suppression of fire post-settlement, these small trees grew rapidly and converted prior savannas to dense forests (Packard and Mutel 15).

Pockets of low areas and natural drainage ways harbored rich and bio-productive marshes and sedge meadows [Figure 5]. These wetlands not only provided important resources and habitat for Illinois wildlife, but they also served to filter water, store floodwater from rain events, and recharge groundwater. Numerous plant species thrived in the saturated or inundated soils of wetlands, including a variety of sedges, rushes, and grasses. In years with favorable plant growth and weather conditions, wildfire also burned in wetlands, playing a similar role in the wetlands as it did in the uplands.

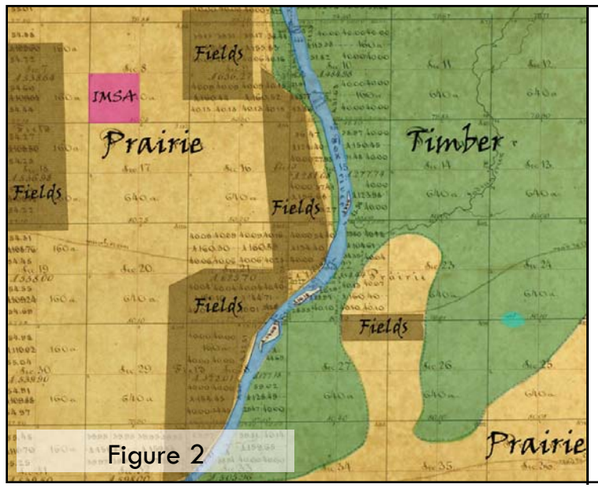


Figure 2

IMSA Site: By referencing the historic "Federal Township Plats of Illinois (1809-1891)" [Figure 2] we gain an understanding of what the vegetation characteristics of the IMSA site likely would have been at the time that the first surveyors moved through Aurora Township. Stands of timber, streams, marshy areas, cultivated fields, and towns are typically recorded on these maps. The plat maps of Aurora Township shows the IMSA site would have been wide-open prairie prior to European settlement. This makes sense as historically, prairie fires would have raced across the dry grasses of the Grand Prairie and Northeastern Morainal Divisions fueled by prevailing western winds until its flames hit the cool waters of the Fox River. These frequent, hot fires would have suppressed woody plant growth, establishing a complex prairie ecosystem west of the Fox River, including the current IMSA campus site.

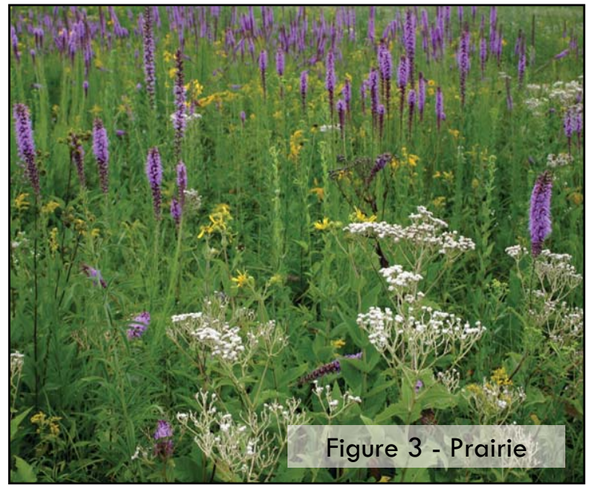


Figure 3 - Prairie

Figure 4 - Savanna

Figure 5 - Wetland

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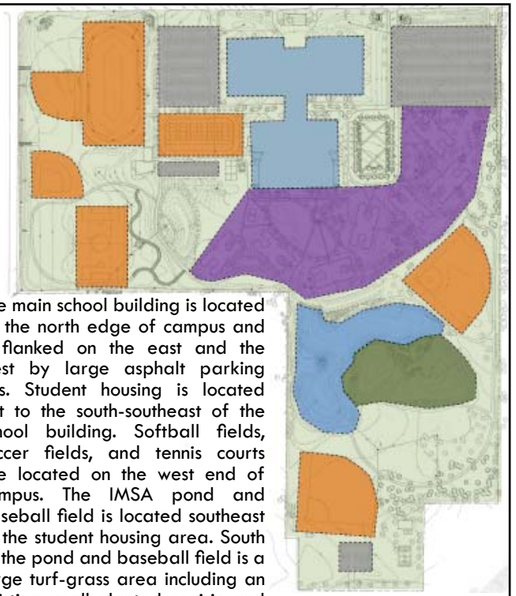
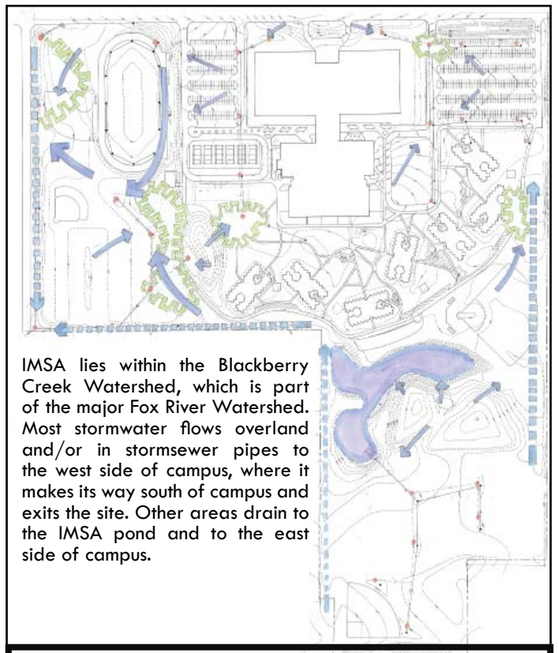
Illinois Mathematics and Science Academy
Sustainable Landscape Plan

Site Analysis



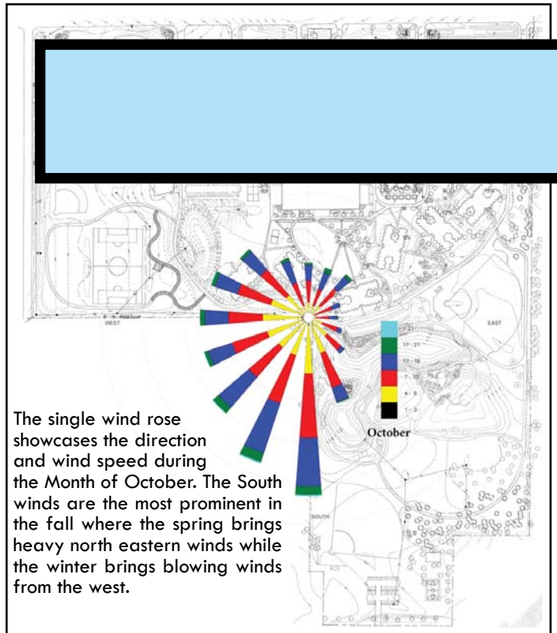
The main school building is located on the north edge of campus and is flanked on the east and the west by large asphalt parking lots. Student housing is located just to the south-southeast of the school building. Softball fields, soccer fields, and tennis courts are located on the west end of campus. The IMSA pond and baseball field is located southeast of the student housing area. South of the pond and baseball field is a large turf-grass area including an existing small planted prairie and rain garden.

Site Use Map



IMSA lies within the Blackberry Creek Watershed, which is part of the major Fox River Watershed. Most stormwater flows overland and/or in stormsewer pipes to the west side of campus, where it makes its way south of campus and exits the site. Other areas drain to the IMSA pond and to the east side of campus.

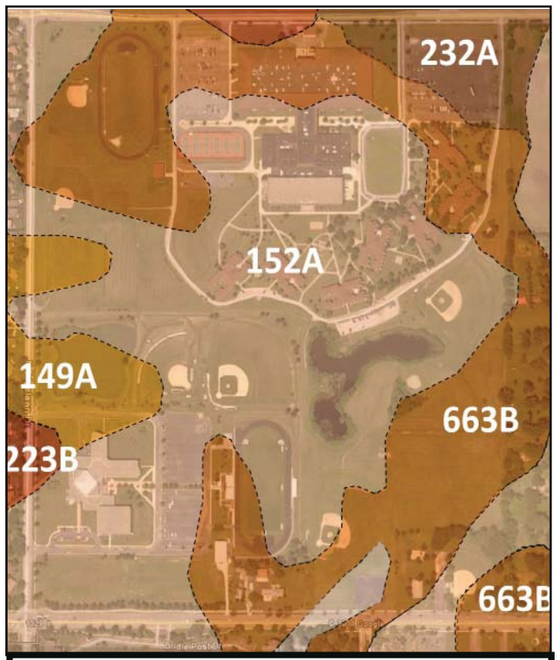
Site Drainage Map



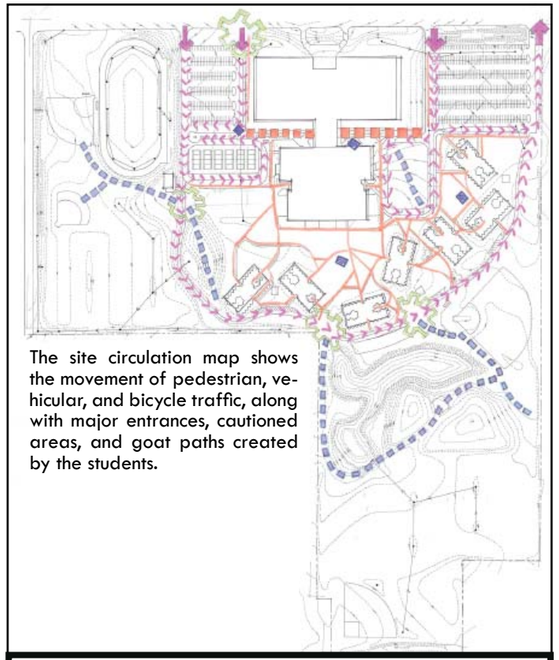
The single wind rose showcases the direction and wind speed during the Month of October. The South winds are the most prominent in the fall where the spring brings heavy north eastern winds while the winter brings blowing winds from the west.

Wind Analysis Map

Site Context Map



Site Soils Map



The site circulation map shows the movement of pedestrian, vehicular, and bicycle traffic, along with major entrances, cautioned areas, and goat paths created by the students.

Site Circulation Map

SITE SOILS MAP – The majority of the soils on-site are Drummer series (152A), the second highest percentage is Clare Series (663B). Drummer soils are poorly drained, have relatively high water tables and are prone to saturated soils and periods of inundation. Historic native vegetation included hydrophytic grasses, reeds, and sedges. The Drummer soil areas make up most of the Sports areas, which is why there are stormwater issues in these areas…it also makes these areas ideal for wetland re-construction. Clare soils are moderately well-drained with water tables typically lower than Drummer. Historic native vegetation was prairie grasses. The Clare soil areas make up most of the open grass areas in the southeast part of campus, making them ideal for prairie re-construction.

SITE CONTEXT MAP - IMSA is located in a highly urbanized area. The campus is flanked by Sullivan road to the north, which abuts a retail shopping center and an industrial area. Edgelawn Drive flanks the west edge of campus, which abuts single family residential. The south edge of campus is shared with a private High School on the west corner and a Local Park on the east corner. Further south is comprised of residential and places of worship. The east edge of campus abuts residential with sporadic small-scale retail. A major interstate (I-88) is located just ½ mile to the north of campus, a major local road (Orchard Road) is located approximately ¾ mile to the west and is flanked by retail/commercial, and the Fox River is located just 1 ½ mile to the west of campus.

- Yellow - Schools/Education
- Green - Park Land/Open Space
- Blue - Places of Worship
- Orange - Retail/Commercial
- Red - Industrial

SITE USE MAP - Color Legend

- Lt. Green - Mown Lawn/Open Space
- Blue - Open Water/Pond
- Orange - Sports Fields
- Purple - Student Housing
- Dk Green - Existing Natural Area

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Overall Site Masterplan

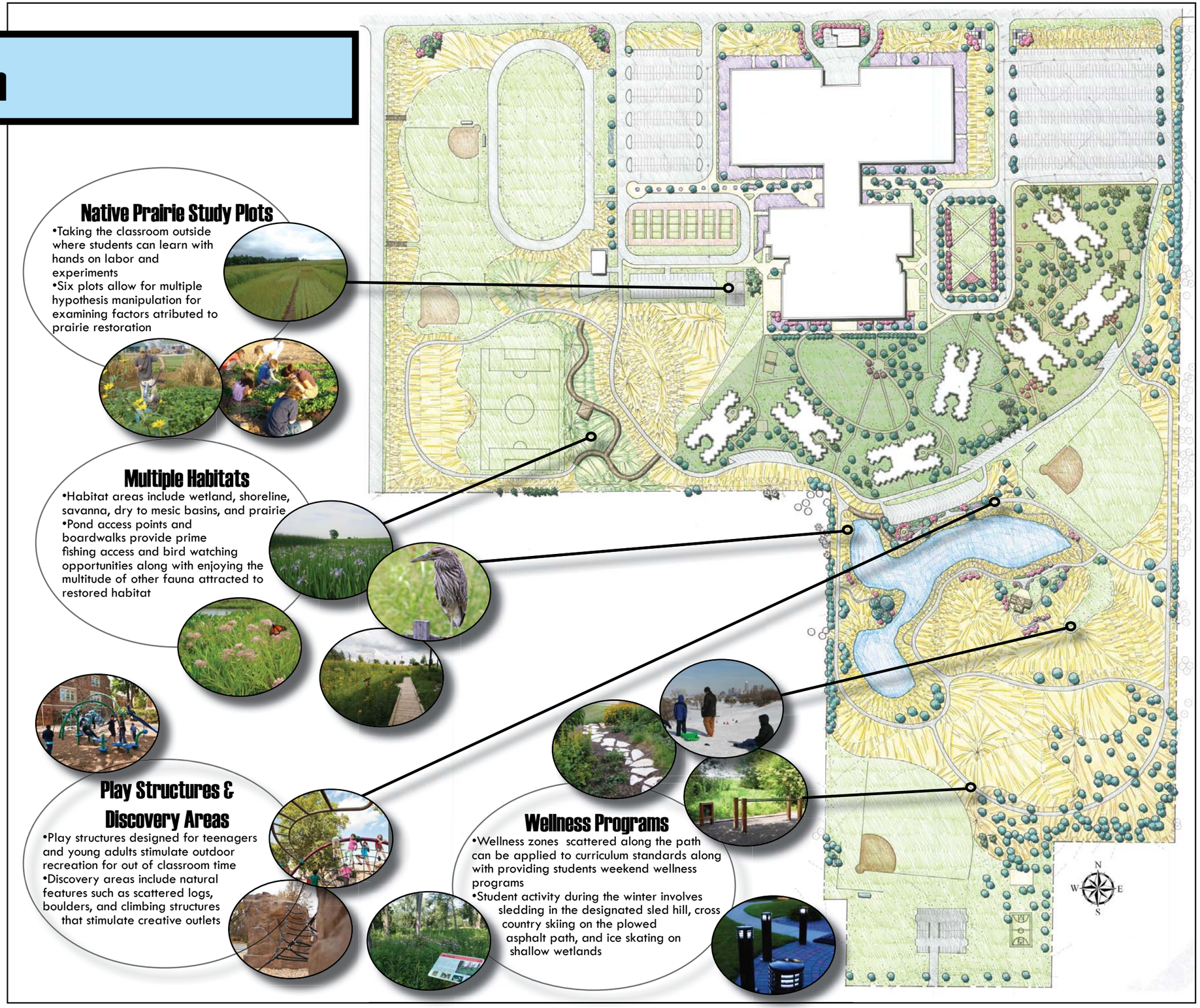
Utilizing the ideas, concerns and programmatic wishes that came out of the brain-storming sessions with IMSA faculty and staff, the design team has developed an overall graphic site masterplan that aims to incorporate as many of the features generated by faculty and staff in order to achieve this document's stated goals, while maintaining and furthering the overall mission of IMSA. Following are descriptions of some of the key features of the design and the associated goal(s) they help achieve:

Arboretum – The Arboretum provides another teaching tool to the Science Program. It is recommended that the Arboretum be confined to the area shown for the following reasons:
1.) it is in close proximity to the school building and will not require the teacher to utilize much valuable class time traveling to the alternative teaching site; 2.) If it is located in a confined location it will be easier for the instructor to move from plant-to-plant while teaching; 3.) Implementation of this plan should result in a cohesive aesthetic for the IMSA campus, which will require conformity of both hard materials and plant materials…Arboretums typically contain a large variety of plant species, therefore by keeping the Arboretum confined as opposed to spread throughout campus will result in a cleaner aesthetic. (Goal #2)

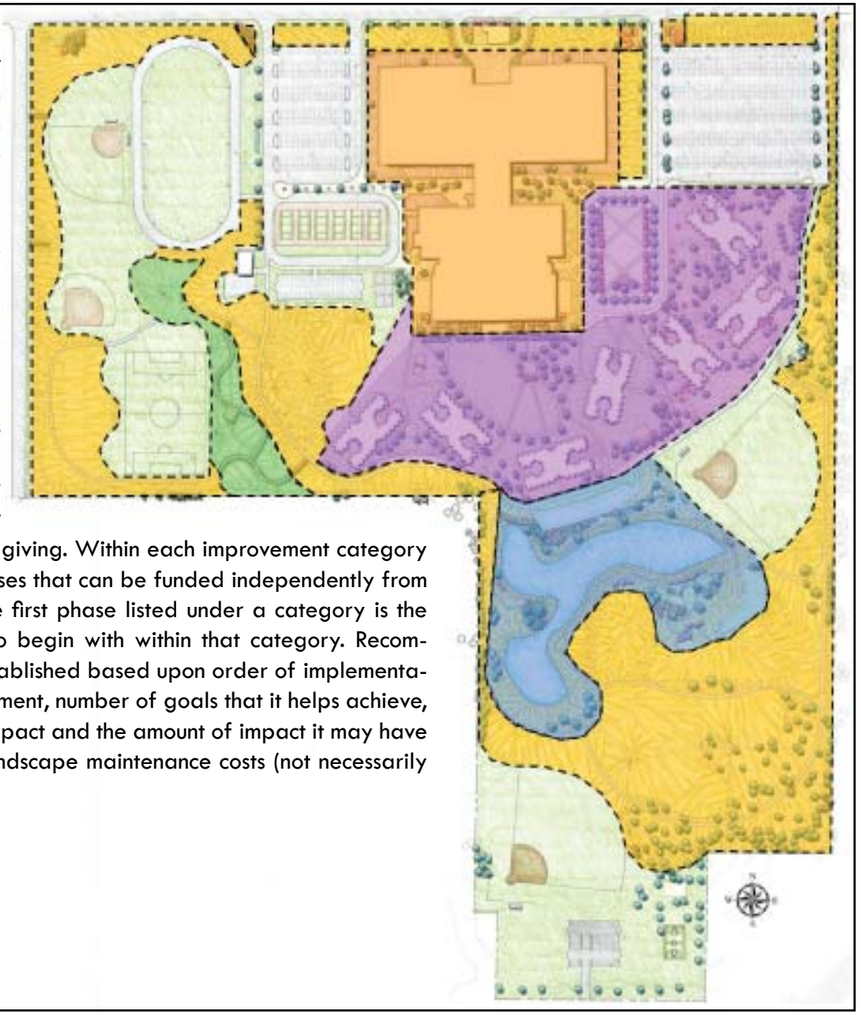
Sledding Hill – The sledding hill provides a space for student recreation and socialization in the winter (Goal #3)

IMSA Pond Restoration – The pond has the potential for being an ecological showpiece on campus and it is a shame that it is currently referred to as the "No Pond". A well restored, healthy pond has an aesthetic value that is unmatched. Beyond that it provides a whole other dimension of ecosystem study to the biological sciences. Furthermore, it provides a system of study that extends beyond biology into the chemistry and physics programs. With proper water access points it also will enhance extracurricular activities as the pond is utilized by the IMSA Bass Fishing Team for practice sessions. For students, the pond area can become a solace place to "escape" from the hustle of campus life. It is well recognized in environmental psychology that the sound of water is a great stress reliever and the mere sight of water elevates mood instantaneously in the vast majority of humans. (Goal #s 1, 2 & 3)

Prairie Re-Creation – The implementation of large prairie areas will eliminate high-maintenance turf grass and replace it with low-maintenance natural areas. These
(**Continued on page 8**)



In order to organize the multiple project areas, project types, and the goals that each helps achieve, the master plan has been seperated into five distinct categories: Turf-to-Prairie, Miscellaneous Enhancements, Residence Area & Student Quad Areas, Enhancments at the Pond Area and Wetland Re-Creation Areas.



The intent of categorizing areas with similar treatments is to better streamline the procurement of funding either through appropriate grant applications or through donor giving. Within each improvement category there are also a series of phases that can be funded independently from one-another. In most cases the first phase listed under a category is the recommended improvement to begin with within that category. Recommended phasing has been established based upon order of implementation, feasibility of the improvement, number of goals that it helps achieve, aesthetic impact, ecological impact and the amount of impact it may have regarding the reduction of landscape maintenance costs (not necessarily in this order).

Turf-to-Prairie Area

The turf-to-prairie area recommendations consist of a simple process of applying herbicide to existing turf grass and installing appropriate native seed with a no-till native seed drill. This project category totals approximately 23 acres and can be subdivided into the following phases:

- Phase I- Prairie Restoration (Approx. 20 acres)
- Phase II- Savanna Restoration (Approx. 3 acres)
- Phase III- Asphalt Trails
- Phase IV- Interpretive Signage

Miscellaneous Enhancements

Miscellaneous improvements include the conversion of existing "traditional" landscaping areas and/or existing turf grass areas directly adjacent to buildings and/or major roads and sidewalks to a formal landscape utilizing native species. This category also includes various improvements focused on enhancing student life through increased access to unstructured activities, such as new play equipment, rock & log "discovery areas", etc. This project category can be subdivided into the following phases:

- Phase I- Entry Landscape 1
- Phase II- Entry Landscape 2
- Phase III- Landscape Conversions
- Phase IV- Play Structures
- Phase V- Discovery Areas

Wetland Re-Creation Area

This project involves minor earth grading to lower the final elevations of the wetland, installation of appropriate native seed and plugs, installation of a temporary erosion control blanket, and the installation of a boardwalk system with overlook areas. This project category totals approximately 2 acres and can be subdivided into the following phases:

- Phase I- Bioswale Conversion
- Phase II- Wetland Restoration (Approx. 2 acres)
- Phase III- Boardwalk & Overlook System
- Phase IV- Interpretive Signage

Enhancements at the Pond Area

The pond area has tons of aesthetic and activity potential. It basically involves the removal of existing Willow thickets, shoreline stabilization with native plants, and a series of user enhancements. This project category can be subdivided into the following phases:

- Phase I- Shoreline & Prairie Restoration
- Phase II- Asphalt Trail & Boardwalk
- Phase III- Crushed Stone Trail & Access Points
- Phase IV- Council Ring Area
- Phase V- Memorial Garden & Gazebo Area
- Phase IV- Interpretive Signage

Residence Area & Student Quad Areas

The residence area would benefit from two major enhancement projects and would serve a critical purpose to further the goal of enhancing IMSA's science curriculum by providing a logical space for an "Arboretum" to be developed. This project category can be subdivided into the following phases:

- Phase I- Formal Quad Area
- Phase II- Informal Quad Area
- Phase III- IMSA Arboretum Establishment

(**Continued from page 7**)

areas will become high-quality wildlife habitat that will be utilized for student recreation (wildlife watching) and for academic curriculum enrichment (wildlife surveys and study). (Goal #s 1, 2, 3 & 4)

Prairie Research Plots – Research plots will allow for very regimented academic curriculum enrichment and may produce hard data that can prove to be of value to the scientific community as a whole (Goal #s 1, 2 & 4)

Savanna Re-Creation – Savannas are an endangered ecosystem and therefor have very unique and important wildlife species that are inhabitants thereof. Savannas are one of the most sought after environments by humans as well; most of our parks are built to replicate the widely spaced, open-grown canopy trees and low-profile grassy groundcovers typical of historic Illinois Savannas. (Goal #s 1, 2, 3, & 4)

Wetland Re-Creation – Wetland and wet-bottom conveyance features (i.e. bioswales) will eliminate areas of high-maintenance turf-grass and convert them into high-quality wildlife habitat. By passing stormwater through these areas full of native plants they will filter and cool the stormwater prior to releasing it to downstream waters, particularly runoff from the highly fertilized sports fields. If designed correctly, the wetland area will also provide a large, shallow-water (6-12" deep) area that when frozen in winter can safely be utilized for ice skating and other winter activities, without the deep water liabilities that the pond is bound with. (Goal #s 1, 2, 3 & 4)

Trail Loop – The trial loop has been designed to integrate into existing circulation routes on campus (sidewalks, etc.) and will provide in excess of 0.5 miles of uninterrupted pathway. The main trail should be designed to be ADA compliant so that it is accessible by all students and faculty, this will also increase its usability by all students for a larger range of activities, including the use of wheeled vessels (skateboards, bikes, in-line skates, rip-sticks, etc.). A hard surface, such as asphalt, can also be plowed during the winter months, increasing the amount of winter activities available to students. Trails will also provide access to the larger natural areas for study by IMSA programs, and if an interpretive signage program is implemented the trails become interactive learning tools for non-programed student education. (Goal #s 2 & 3)

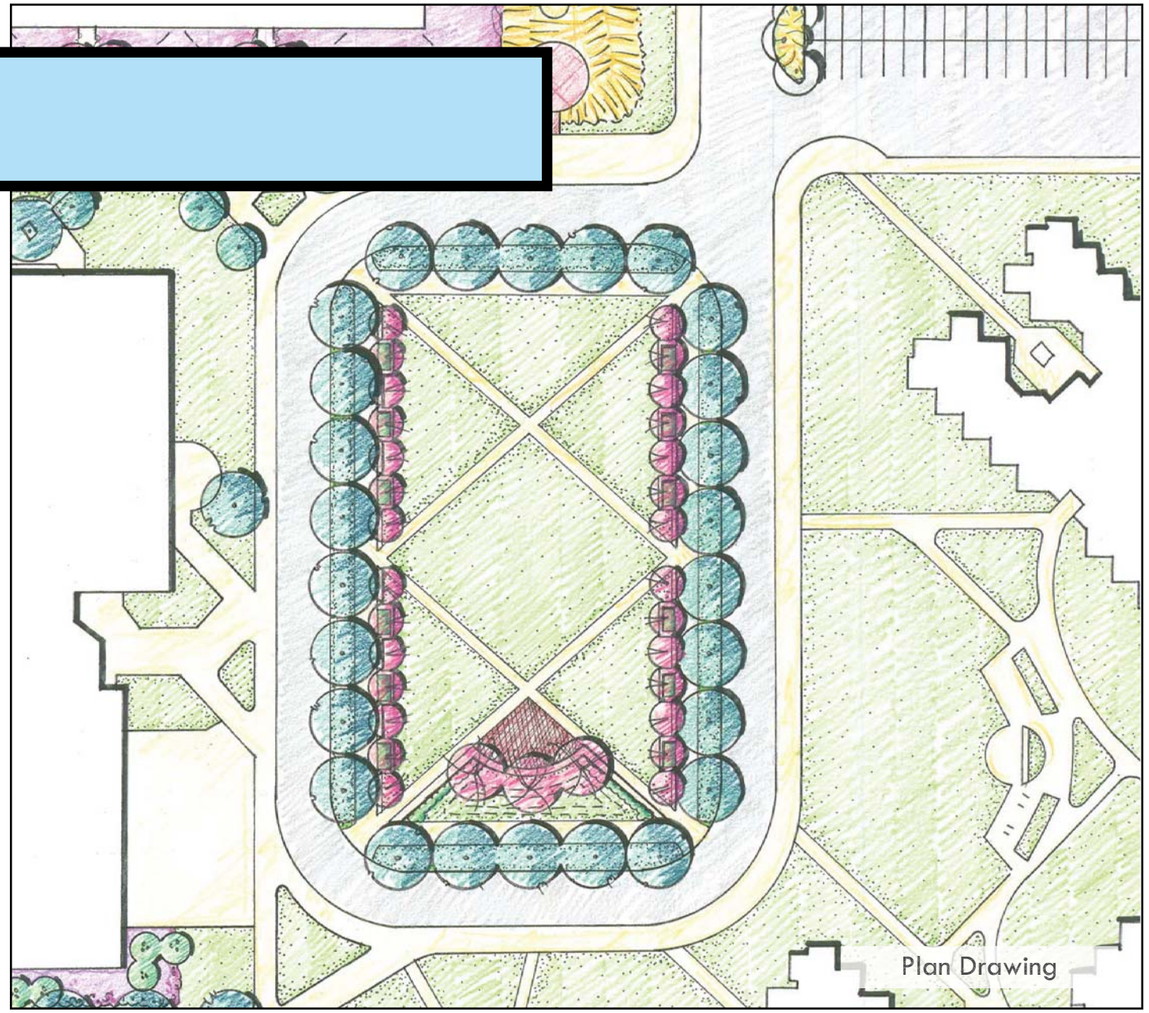
IMSA Quad – The Quad is intended to provide a large organized gathering space for students, making it the social "hub" of campus. It is designed to provide gathering space for large groups, special events (such as musical performances, dances or theater performances), smaller independent gathering spaces, and spaces ideal for outdoor teaching with its close proximity to the main school building. An informal Quad has also been designed south of the main building, which provides a large grass area for Frisbee/Ball Toss type activities (Goal #s 2 & 3)

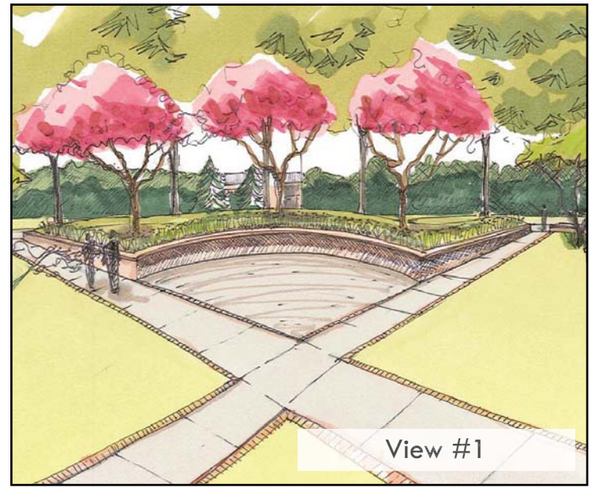
Formal Quad Plan

IMSA Formal Quad – The Formal Quad is intended to provide a large organized gathering space for students, making it the social "hub" of campus. It is designed to provide gathering space for large groups, special events (such as musical performances, dances or theater performances), smaller independent gathering spaces, and spaces ideal for outdoor teaching with its close proximity to the main school building. It also provides an attractive feature at the main entrance of campus where parents and other visitors pass by when parking and entering the building. Currently the area is a wide open grass area that students use for playing frisbee, football and other outdoor activities. The result of this kind of active use is a torn-up lawn that does not present the best face of IMSA to visitors of the campus. An informal Quad has also been designed at the south end of the building, which will provide a large open lawn area to replace the Formal Quad's current function. (Goal #s 2 & 3)

Provided to the right are two view drawings that graphically represent the views that would be seen once this improvement is implemented. In View #1 the south end of the Quad contains a small amphitheater for organized gatherings. In view #2 an undulating "seat-wall" has been proposed. This type of feature will provide smaller, more intimate gathering spaces on the exterior and the interior of the Quad space for use by teachers as outdoor classroom space and by students for general socialization.

At the bottom of the page is a photo of the Quad at the University of Illinois in Champaign-Urbana, which is the type of environment envisioned by this improvement. Additional example photos of possible improvements/features are also shown here.


Plan Drawing


View #1

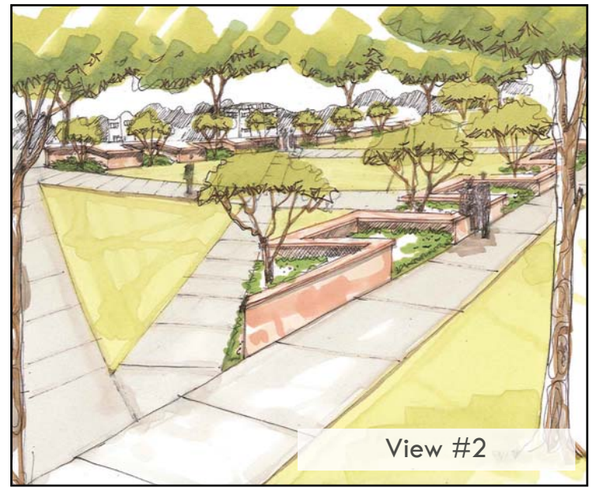

View #2


Photo of the Quad at the University of Illinois

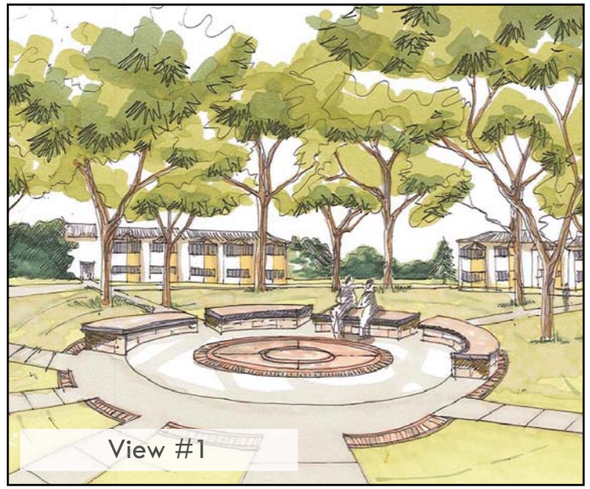
Plan Highlights

Design Cost Estimate - $71,500.00
Construction Cost Estimate - $475,000.00

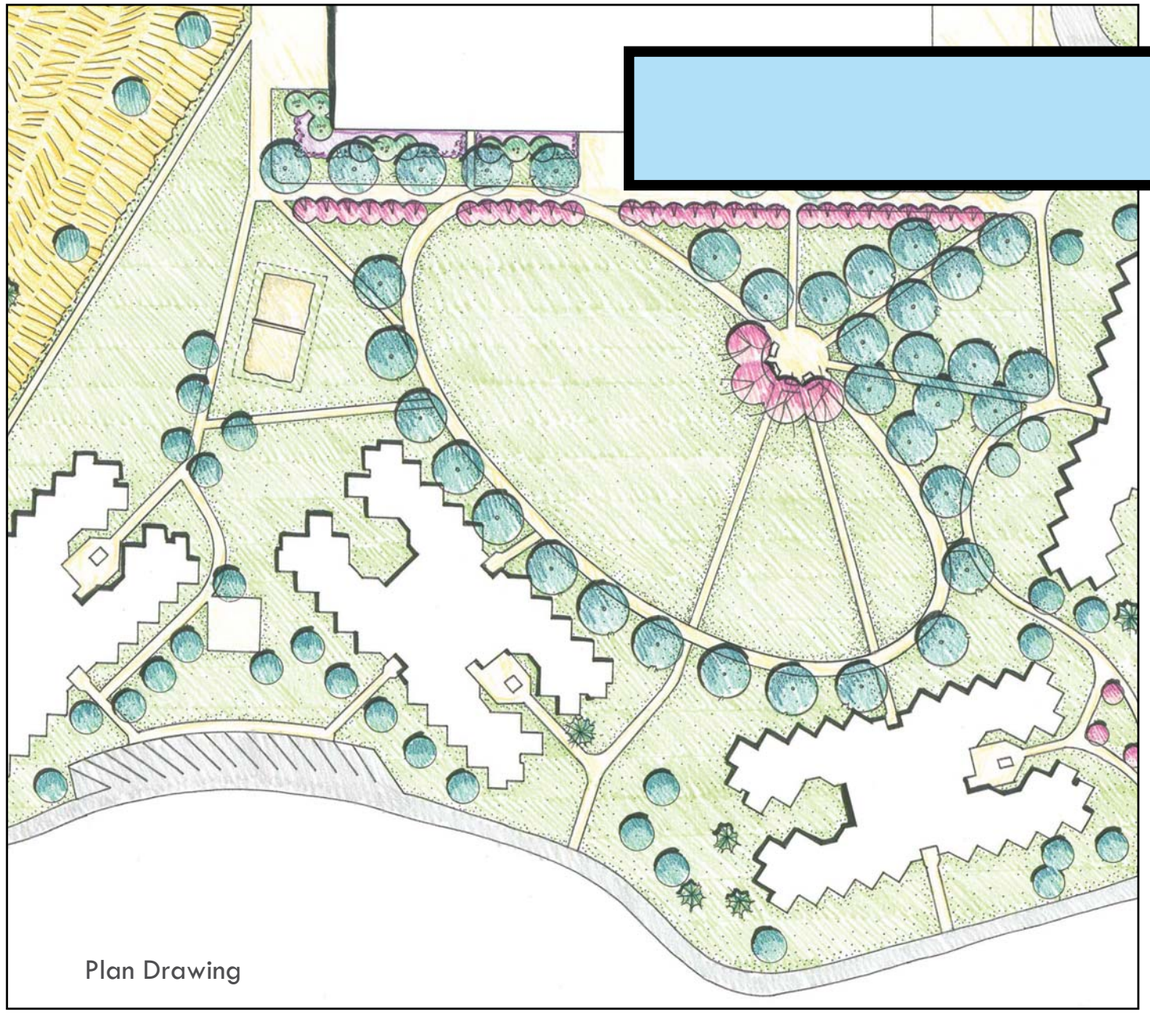
Goals Achieved - 2 &3

Proposed Improvement Provides:
- -Large Entertainment Venue
- -Intiment Gathering Space
- -A Sense of Place

Informal Quad Plan



View #1



Plan Drawing

Plan Highlights

Design Cost Estimate - $54,100.00
Construction Cost Estimate - $409,100.00

Goals Achieved - 2 & 3

Proposed Improvement Provides:
- -Large Open Lawn
- -Strategic Volleyball Court Placement
- -Efficient Sidewalk Placement
- -Intiment Gathering Space
- -A Sense of Place

IMSA Informal Quad – The Informal Quad is intended to provide a large area consisting of wide open turf grass that students can use for playing frisbee, football and other unorganized outdoor activities. This area is intended to provide a large open lawn area to replace the Formal Quad's current function. This concept also re-routs foot traffic to follow current foot-paths that have been worn into the existing lawn from student travel. (Goal #s 2 & 3)

Provided to the left is a view drawing that graphically represents the view that would be seen once this improvement is implemented. In View #1 the majority of the pathways culminate at a small circular plaza space with seating. This type of feature will provide smaller, more intimate gathering spaces for use by teachers as outdoor classroom space and by students for general socialization. The center of the circle could contain a variety of paving patterns or could serve as a base for sculpture.

At the bottom of the page is a photo of the current Formal Quad location on the IMSA campus, which is the type of environment envisioned by this improvement. Additional example photos of possible improvements/features are also shown here.

Turf-to-Prairie Conversion Areas

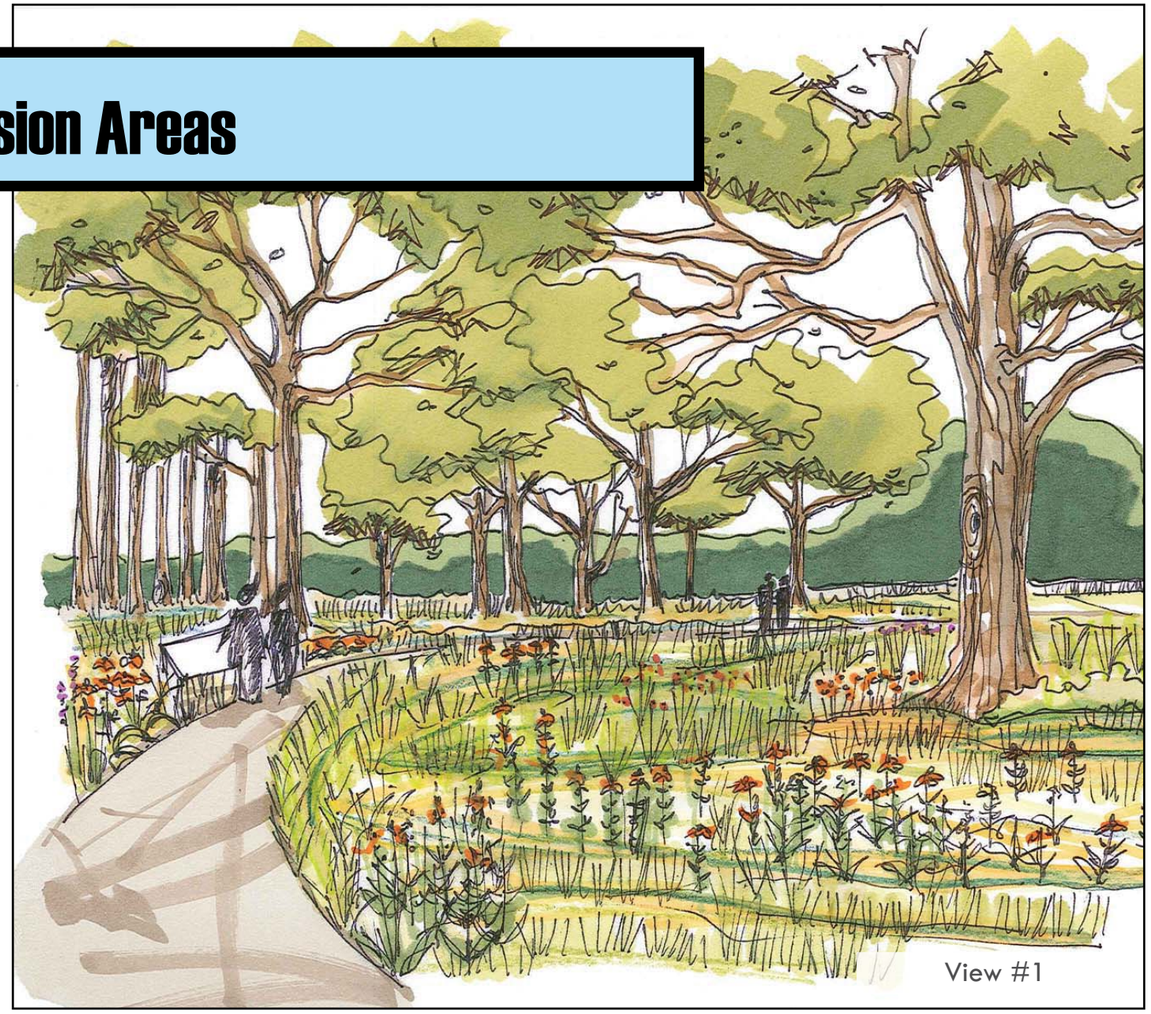
Turf-to-Prairie Conversion – The implementation of large prairie areas will eliminate high-maintenance turf grass and replace it with low-maintenance natural areas. These areas will become high-quality wildlife habitat that will be utilized for student recreation (wildlife watching) and for academic curriculum enrichment (wildlife surveys and study). (Goal #s 1, 2, 3 & 4)

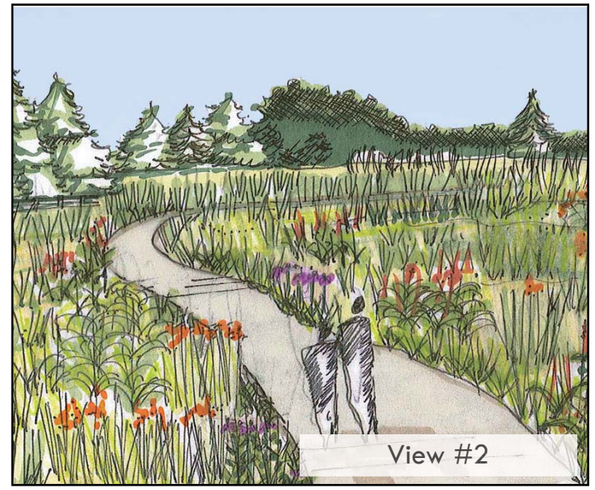
Prairie Research Plots – Research plots will allow for very regimented academic curriculum enrichment and may produce hard data that can prove to be of value to the scientific community as a whole (Goal #s 1, 2 & 4)

Savanna Re-Creation – Savannas are an endangered ecosystem and therefor have very unique and important wildlife species that are inhabitants thereof. Savannas are one of the most sought after environments by humans as well; most of our parks are built to replicate the widely spaced, open-grown canopy trees and low-profile grassy groundcovers typical of historic Illinois Savannas. (Goal #s 1, 2, 3, & 4)

Provided to the right are two view drawings that graphically represent the views that would be seen once this improvement is implemented. View #1 displays what a restored native Oak Savanna habitat would look like. View #2 displays a path traversing areas of restored prairie.

At the bottom of the page is a photo rendering showing the current condition (Before) and the type of environment envisioned by this improvement (After). Additional photos of existing site conditions are also shown here.


View #1


View #2


Before

After

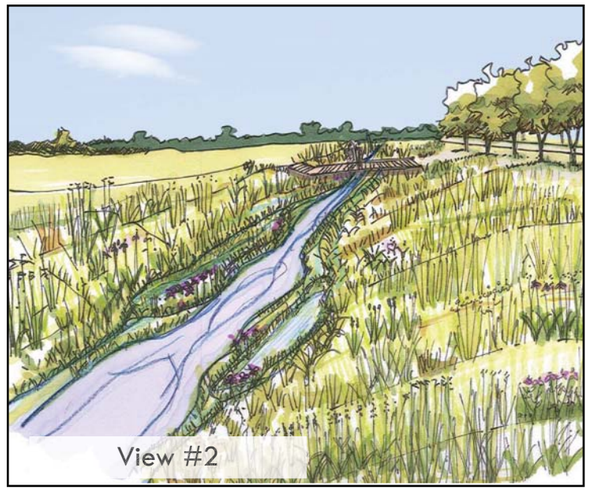
Plan Highlights

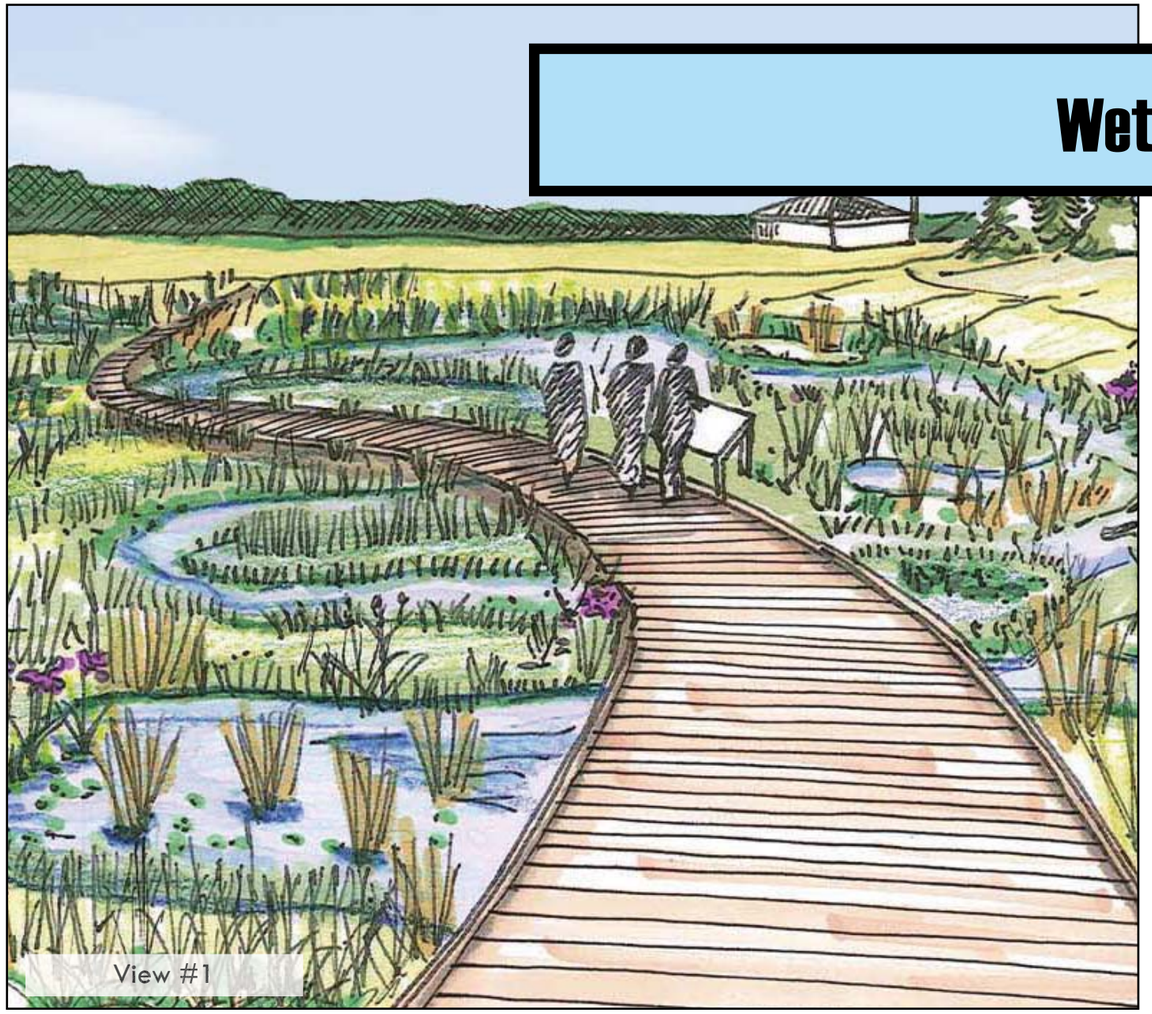
Design Cost Estimate - $87,900.00
Construction Cost Estimate - $593,100.00

Goals Achieved - 1,2,3 & 4

Proposed Phasing (Design Included in Phasing Costs):
- -Turf-to-Prairie - $118,000.00
- -Savanna Restoration - $98,000.00
- -Asphalt Trails - $450,000.00
- -Interpretive Signage - $15,000.00

Wetland Re-Creation Areas


View #2


View #1

Plan Highlights

Design Cost Estimate - $93,430.00
Construction Cost Estimate - $664,670.00

Goals Achieved - 1,2,3 & 4

Proposed Phasing (Design Included in Phasing Costs):
- -Bioswale Conversion - $226,100.00
- -Wetland Restoration - $157,000.00
- -Boardwalk & Overlook System - $360,000.00
- -Interpretive Signage - $15,000.00


Before

After

Wetland Re-Creation – Wetland and wet-bottom conveyance features (i.e. bioswales) will eliminate areas of high-maintenance turf-grass and convert them into high-quality wildlife habitat. By passing stormwater through these areas full of native plants they will filter and cool the stormwater prior to re-leasing it to downstream waters, particularly runoff from the highly fertilized sports fields. If designed correctly, the wetland area will also provide a large, shallow-water (6-12" deep) area that when frozen in winter can safely be utilized for ice skating and other winter activities, without the deep water liabilities that the pond is bound with. (Goal #s 1, 2, 3 & 4)

Provided to the left are two view drawings that graphically represent the views that would be seen once this improvement is implemented. View #1 displays what a restored native Wetland habitat would look like with an installed boardwalk. View #2 displays a naturalized bioswale implemented along the western property of IMSA, complete with boardwalk style crossings.

At the bottom of the page is a photo rendering showing the current condition (Before) and the type of environment envisioned by this improvement (After). Additional photos of existing site conditions are also shown here.

Pond Restoration Plan

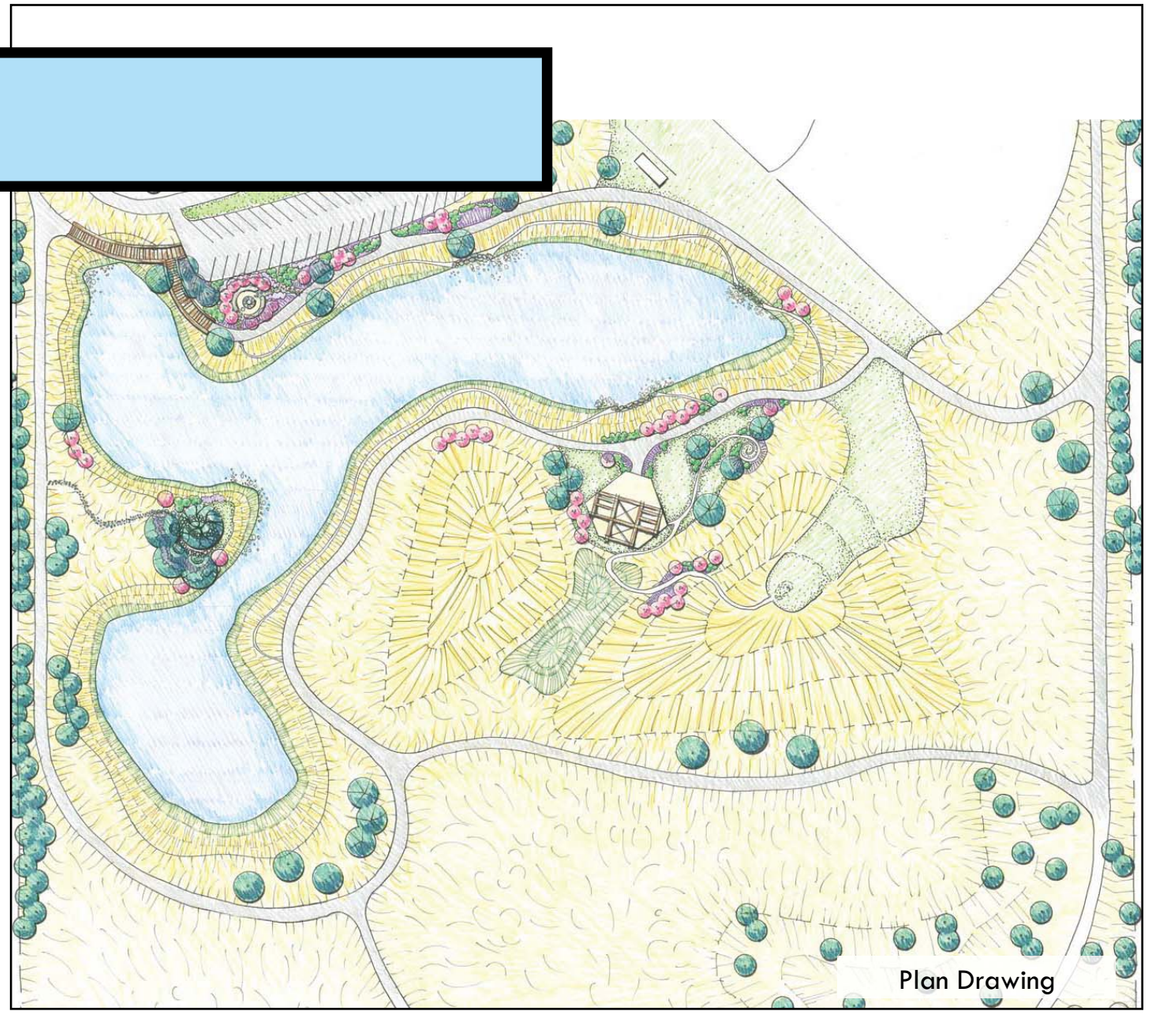
IMSA Pond Restoration – The pond has the potential for being an ecological showpiece on campus and it is a shame that it is currently referred to as the "No Pond". A well restored, healthy pond has an aesthetic value that is unmatched. Beyond that it provides a whole other dimension of ecosystem study to the biological sciences. Furthermore, it provides a system of study that extends beyond biology into the chemistry and physics programs. With proper water access points it also will enhance extracurricular activities as the pond is utilized by the IMSA Bass Fishing Team for practice sessions. For students, the pond area can become a solace place to "escape" from the hustle of campus life. It is well recognized in environmental psychology that the sound of water is a great stress reliever and the mere sight of water elevates mood instantaneously in the vast majority of humans. (Goal #s 1, 2 & 3)

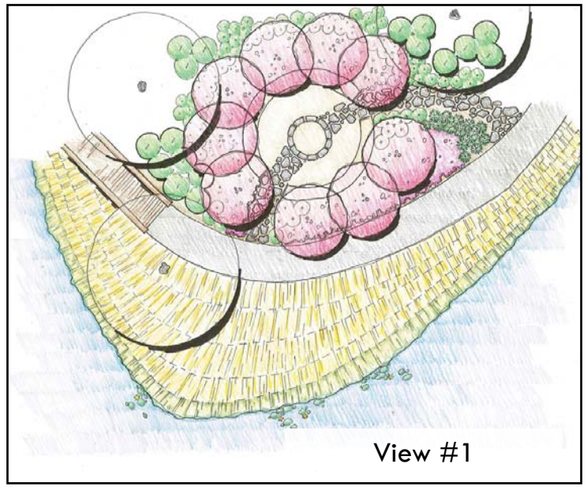
Sledding Hill – The sledding hill provides a space for student recreation and socialization in the winter (Goal #3)

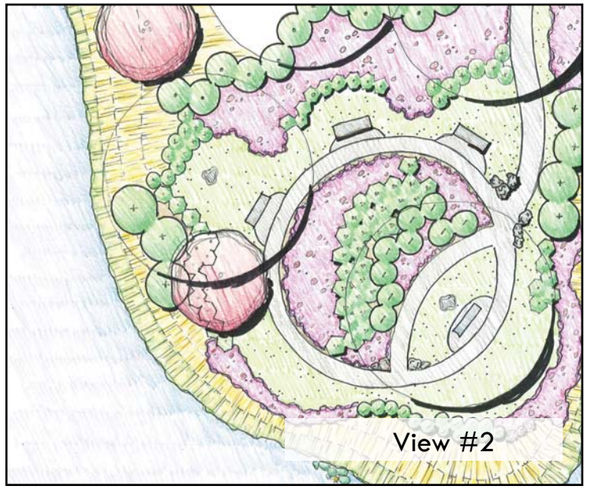
Trail Loop – The trial loop has been designed to integrate into existing circulation routes on campus (sidewalks, etc.). The main trail should be designed to be ADA compliant so that it is accessible by all students and faculty, this will also increase its usability by all students for a larger range of activities, including the use of wheeled vessels (skateboards, bikes, in-line skates, rip-sticks, etc.). A hard surface, such as asphalt, can also be plowed during the winter months, increasing the amount of winter activities available to students. If an interpretive signage program is implemented the trails will become interactive learning tools for non-programed student education. (Goal #s 2 & 3)

Provided to the right is a view drawing that graphically represents the views that would be seen once this improvement is implemented.

At the bottom of the page is a photo rendering showing the current condition (Before) and the type of environment envisioned by this improvement (After). Additional photos of prospective site features are also shown here.


Plan Drawing


View #1


View #2


Before

After

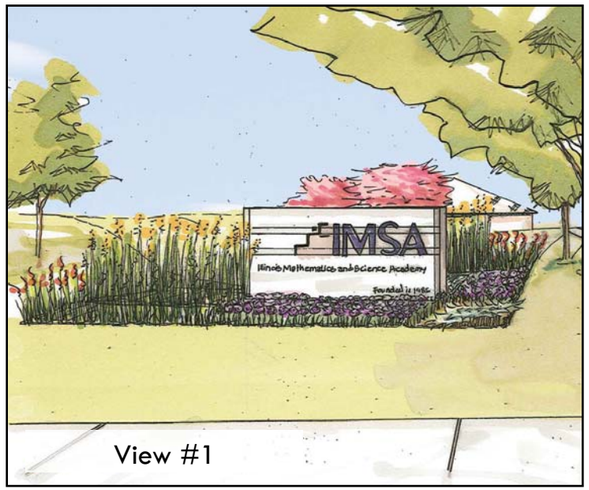
Plan Highlights

Design Cost Estimate - $62,640.00
Construction Cost Estimate - $402,860.00

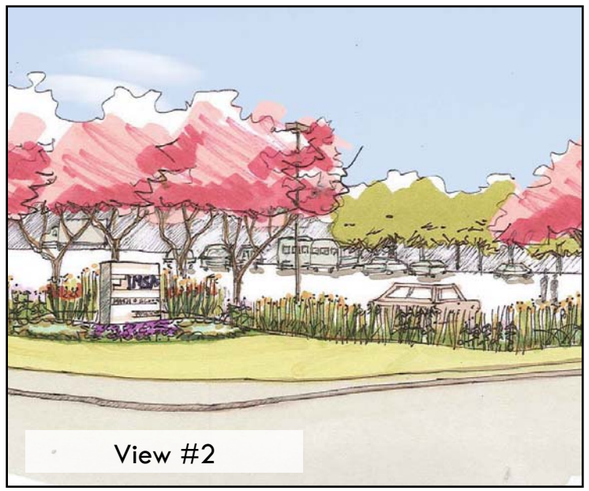
Goals Achieved - 1,2,3 & 4
Proposed Phasing (Design Included in Phasing Costs):
- -Shoreline & Prairie Retoration - $131,100.00
- -Boardwalk - $69,900.00
- -Crushed Stone Trail - $19,400.00
- -Council Ring Area - $29,000
- -Gazebo Area - $50,000.00
- -Interpretive Signage - $15,000.00
- -Pond Ornamental Vegetation -$151,100.00

IMSA®

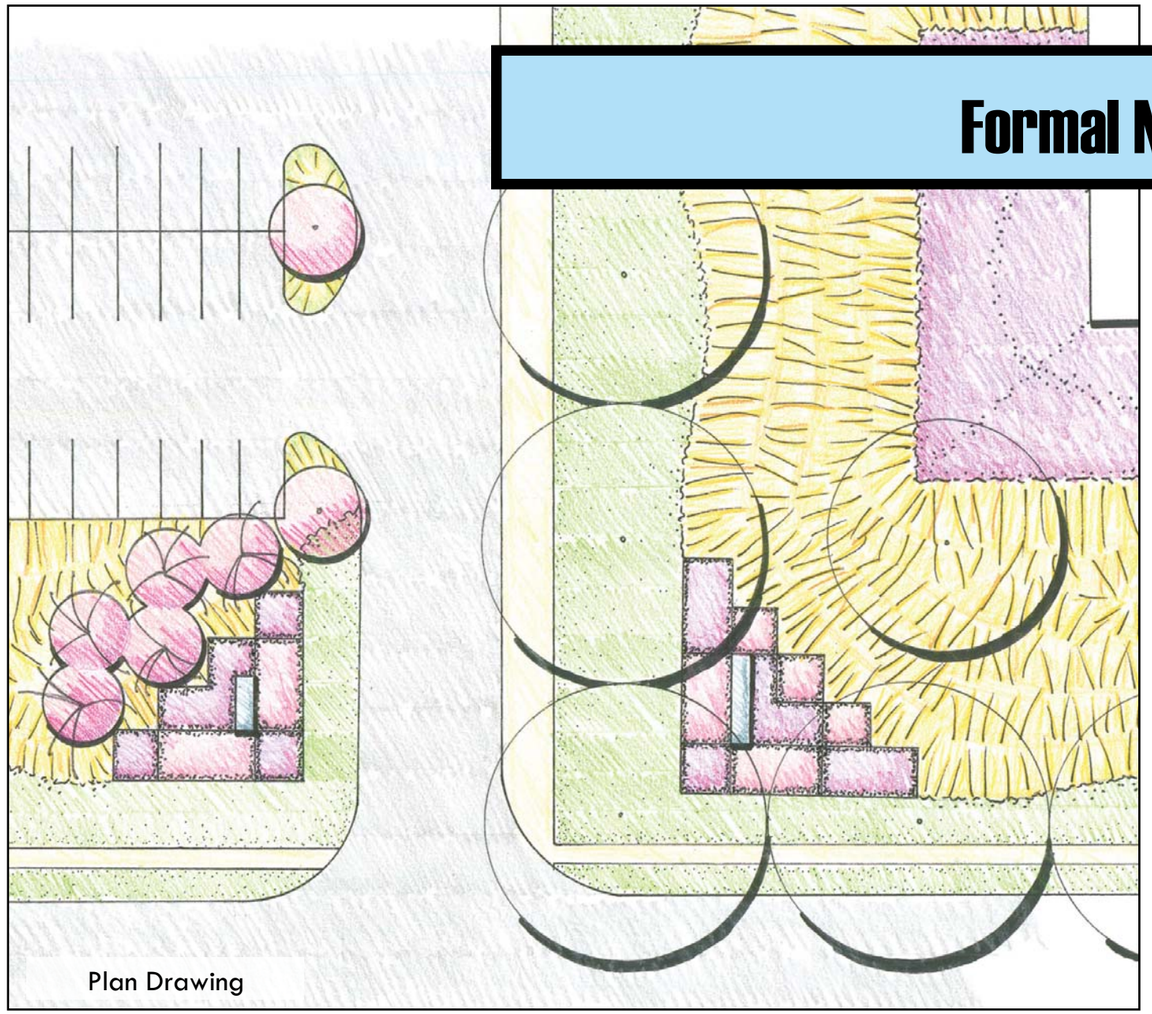
Formal Native Landscape Areas



View #1



View #2



Plan Drawing

Plan Highlights

Design Cost Estimate - $94,800.00
Construction Cost Estimate - $686,900.00

Goals Achieved - 1,3 & 4

Proposed Phasing (Design Included in Phasing Costs):
- -Entry Landscape 1- $44,000.00
- -Entry Landscape 2 - $36,800.00
- -Landscape Conversions - $645,900.00
- -Play Structures - $30,000.00
- -Discovery Areas - $25,000.00

Formal Native Landscape Conversions - By converting existing "traditional" landscape areas and turf areas in areas adjacent to buildings and major circulation corridors, maintenance costs will be reduced and a cohesive aesthetic will be achieved between the natural areas and the formal landscape areas. Also, by utilizing native plants in the formal landscape, they too become high-quality wildlife habitat.

Provided to the left is a plan drawing example and two view drawings that graphically represent the views that would be seen once this improvement is implemented. The plan drawing shows the main entrance for parents and visitors and utilized a landscape bed shape that is representative of the IMSA logo. View #1 displays what the west entrance (right side of drive in plan drawing) plantings would look like when installed. View #2 displays what the east entrance (left side of drive in plan drawing) plantings would look like when installed.

At the bottom of the page is a photo rendering showing the current condition (Before) and the type of environment envisioned by this improvement (After). Additional photos of existing site conditions are also shown here.

Planning Guidelines

In order to achieve the stated goals of this document and further the IMSA mission, attention must be given to the organization of new improvements, access and circulation between existing facilities and new improvements, student safety and the successful establishment, durability and appearance of new improvements. On this page are some section drawings showing "typical" applications for some of the proposed natural area/native plant installations; however this document has been established as a guideline and each project will have to be designed to adapt to actual on-site conditions and regulatory approval while still relating to the overall Greening of IMSA plan. Whenever possible completed improvements should follow these guidelines:

•Is safe, highly visible and encourages student activity

•Is designed to appeal to impromptu use by students and faculty, yet can accommodate larger, organized groups or events

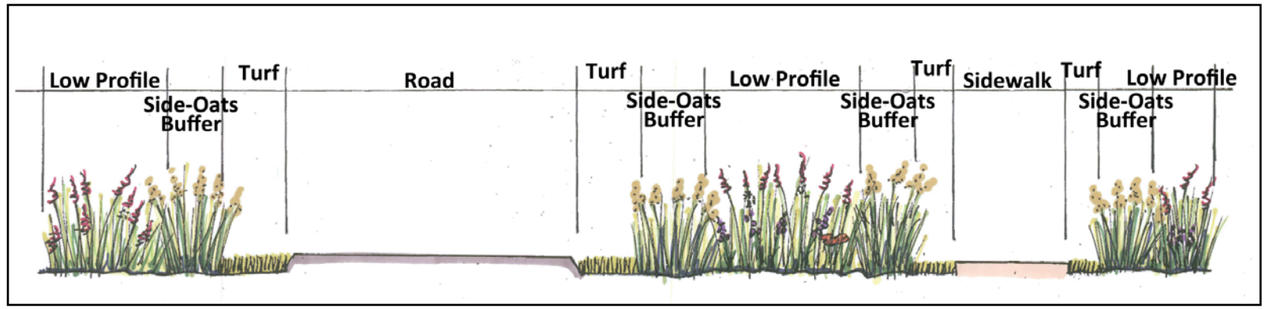
•Is designed to accommodate students and faculty of all ages and physical abilities utilizing barrier free circulation and universal design principles

•Integrates learning, art, and seasonal activities into a variety of distinctive, yet complimentary experiences

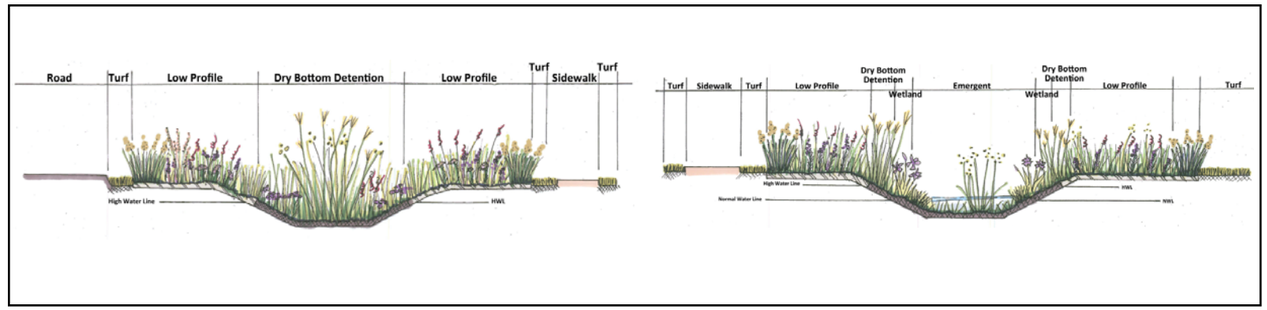
•Is well established and well maintained

•Is constructed using materials and products that complement existing architecture and compliment other improvements

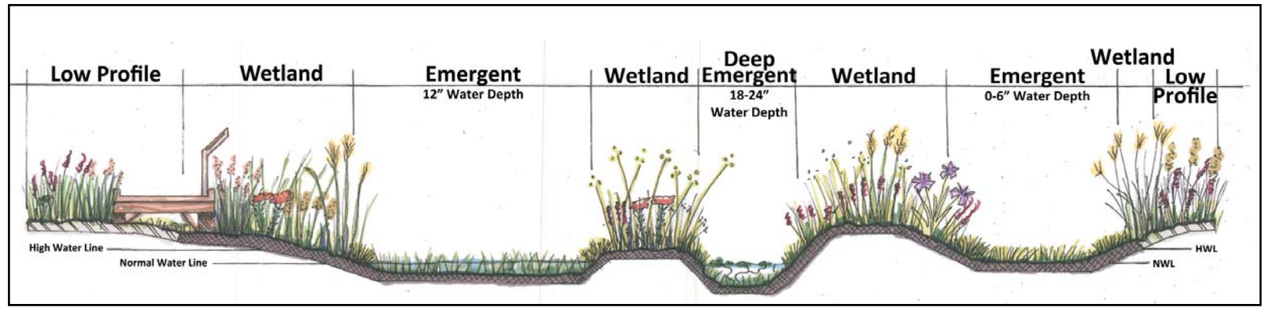
•Can be phased or implemented in increments



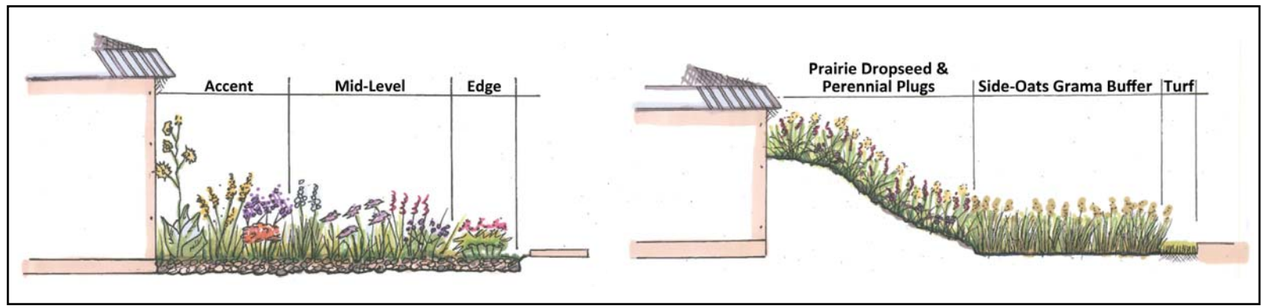
This is a typical cross section displaying the order of planting zones along roadways and trails. On either side of a hard surface should be a minimum 32" width, or a width a few inches narrower than the mower deck being operated by IMSA maintenance staff (maximum should be 10-12' width along some roads where visibility is an issue, follow local regulations for lines of sight). Following the turf is a Side Oats buffer 3-5' wide, which transitions into the fully restored natural area.



This is a typical cross section displaying the order of planting zones in a dry bottom and wet bottom detention basin.



This is a typical cross section displaying the order of planting zones in a wetland re-creation. To get the most habitat out of a wetland there needs to be a variety of wetland depths. Slight changes in soil moisture and water levels will alter the plant community in that zone, thus increasing the types of wildlife that will utilize the wetland.



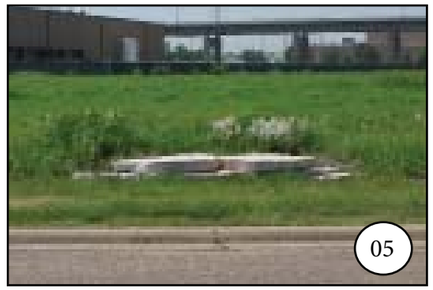
This is a typical cross section displaying the order of planting zones in a traditional landscape planting bed and along the berms adjacent to the main school building. These planting areas will have a restricted native plant pallet and must be maintained to provide a clean, neat aesthetic.


01


02


03


04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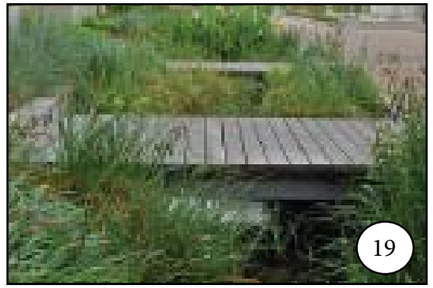

19


20

The intent of this page is to provide photographs of other existing features that are comparable to features proposed throughout this document. Photos provided are not intended to specify or endorse displayed features, rather they are to spark creative thought and provide an example of desired aesthetic, activity or use.

1. Natural areas provide a unique canvas for displaying pieces of art.
2. Parking lot islands can be converted to a solid stand of Prairie Dropseed to reduce maintenance efforts.
3. Council rings provide gathering spaces for learning and socializing.
4. Asphalt pathways that are 10-12' wide provide ample space for multiple active users.
5. Rock outcroppings add interest to the landscape while maintaining a natural aesthetic.
6. Interpretive signage should be considered in multiple locations.
7. Boardwalks come in a variety of designs, this design includes a railing.
8. Age appropriate play structures should be included to encourage activity and socialization.
9. Seating areas should be provided throughout campus, a single style should be utilized.
10. Signage can focus on plants, wildlife, or the environment in general.
11. Mile markers can be utilized along the pathways for fitness purposes.
12. Pergola structures or a gazebo provide ample shade at important gathering spaces along the pond
13. Unconventional play areas, such as this pre-cast concrete boulder, encourage creative play.
14. Solar bollard lighting along asphalt pathways
15. Uniquely designed benches provide resting space but can also encourage creative play.
16. Exercise stations can be installed along the main pathway, they should not be installed within the wildlife habitat area.
17. Boardwalks provide access to wetland areas that would otherwise be inaccessible.
18. Features as simple as large logs placed as "discovery nooks" within the natural areas encourage creative play and socialization.
19. Pedestrian boardwalks allow access over bioswales from the road to the baseball fields
20. Seatwalls define spaces while providing informal seating areas used for learning and socialization.

Native Plant Installation Primer

The installation of native plant species can occur through the planting of either seed and/or plugs.

SEEDING is the main approach to restoration because it is economical; however it will take three to five years before good establishment is achieved. Whenever possible native seed should be installed with a no-till drill seeder that is designed to plant native seed, such as the Truax brand [Figure 6]. The main feature of these drills that make them unique is the seed delivery system. There are three separate seed boxes on a Truax, one for small seed, one for large seed, and one for fluffy seed. In a regular drill seeder designed for turf seed there is only one seed box, if you were to put all three types of native seed together in one box they would become separated as the drill gets bounced around during installation with the fluffy seed coming to the top, the small seed settling at the bottom, and the large seed somewhere in between…this would result in a patchy distribution of seed. To be able to utilize the Truax as designed, seed needs to be ordered and delivered as individual species so that it can be separated and mixed appropriately, do not order native seed that arrives pre-mixed. Success in natural areas restoration will also be dependent upon the native plant's ability to out-compete weedy/invasive species for sunlight, nutrients, and water. This means that the more native seed we put down, the better the results are going to be. We highly recommend native seed rates at approximately 20 lbs per acre or more; however mixes should be customized to maximize the number of seeds per square foot based on the needs of each individual site. We also highly recommend the installation of an EndoMychorizal inoculant at 40 lbs/acre and a cover crop of Seed Oats (Avena sativa) at 60 lbs/acre with the native seed. A cover crop will reduce the potential for erosion and will mark the planted rows for easier monitoring in the first year(s) of restoration. The inoculant provides a fungus that develops a symbiotic relationship with the native plant. This fungus attaches itself to the roots of the plant, the fungus collects nutrients from the soil and passes them on to the plant and in exchange the plant gives the fungus sugar. This plant to fungus relationship dramatically increases root production and foliage growth in the young native seedlings. If the site is not accessible by tractor it will have to be tilled or scarified and seeded by hand. When seeding by hand, mix the seed with an inert material such as damp sand or wood shavings at a 2:1 (inert material:seed) ratio. With either method of seeding, it is imperative to achieve good seed to soil contact while maintaining a seeding depth of no greater than 1/4" for proper germination. Native seed must not be buried too deep.

PLUGS are live native plants already growing, typically in 2" pots [Figure 7]. They develop and mature rather quickly, however they are expensive and should be reserved for specialized restoration situations. Situations that may warrant the installation of plugs include, but are not limited to in saturated soil or submerged soil situations where seeding is difficult or impossible, to establish species that have difficulty germinating from seed (such as Shooting Star or Prairie Drop Seed), or in a landscape situation where control over plant location is desired. Plugs can also be useful in diversifying established natural areas. The most efficient way to plant plugs is to utilize a power auger with a 2" auger bit, such as the one manufactured by Sthil. The auger can be used to plant plugs through erosion blanket if done with care, however utilizing the sharp end of a pick axe to puncture the blanket and create a planting cavity is typically more effective. The most inefficient way to plant plugs is by using hand tools, such as planting trowels or shovels, however hand tools are fairly inexpensive and can be easily and safely used by student/volunteer groups. Herbivory should be kept in mind when planting plugs, particularly when planting them in close proximity to water. Plug plantings are often decimated by Geese, Muskrats, or by grass-eating Carp. An exclosure netting consisting of 2" x 2" wooden stakes, chicken wire or black plastic fencing, zip ties, and nylon string can be erected to effectively keep Geese away from newly planted areas [Figure 10]. Goose exclosures are temporary structures and are typically only necessary throughout the first growing season and can be taken down once the plants become established. These structures are not effective at

Figure 6

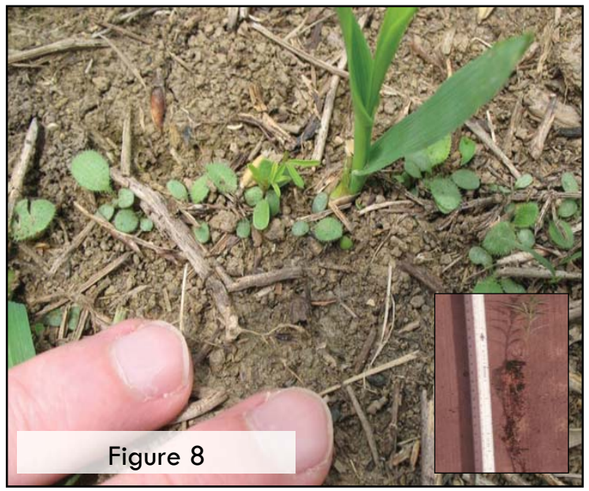


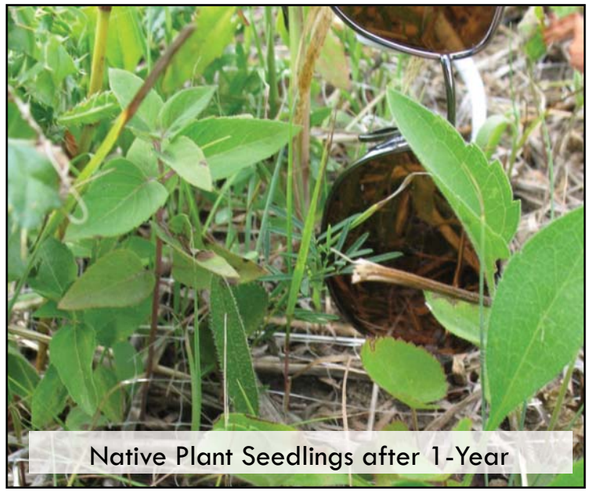
Figure 8

Figure 9

Figure 7

keeping fish or Muskrats away from newly planted areas however, and additional actions must be taken to eliminate damage from these species such as trapping for Muskrats and fish-kills for Carp. Muskrats need only be trapped and removed from site until the plants become thoroughly established, typically once the plants become established minimal damage is done through browsing. If populations become high and plant populations are being severely damaged, trapping should be reinstated.

EROSION CONTROL [**Figure 9**]**:** Temporary erosion control structures should be installed over any areas with exposed soils. Typically the two types of erosion control utilized in the restoration industry are erosion control blankets and coir fiber logs. Coir fiber logs are dense logs constructed of coconut fiber and are installed along shorelines to buffer wave action. These products are temporary structures degrading over a 36 month period and are typically utilized in stream restoration projects where the water is consistently moving. Coir logs are very expensive and are typically not necessary for shoreline restorations conducted on ponds and lakes. Erosion control blankets are recommended anytime planting is being conducted on bare soil. Blankets utilized in restoration should be temporary biodegradable products and are typically made of straw, coconut fiber, or a combination thereof. Permanent "Turf Reinforcement Mats" should not be used; these products leave permanent thick plastic netting on the soil that will make supplemental seeding/planting efforts difficult if needed at a future date. After soil preparation install the native seed, install an appropriate erosion control blanket according to the manufacturer, and finally install plugs through the blanket, if necessary, ensuring not to damage the blanket.



Native Plant Seedlings after 1-Year

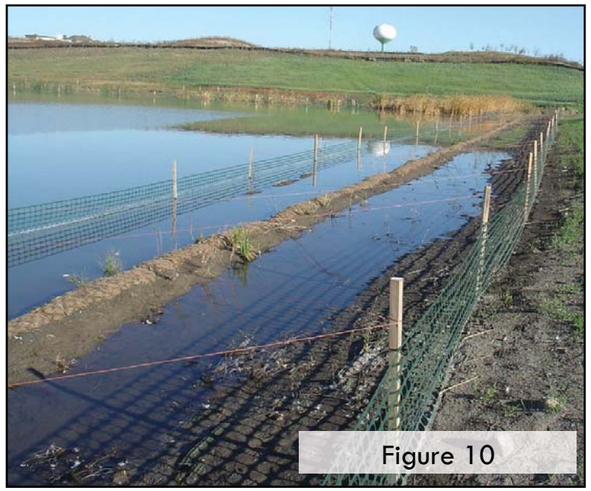


Figure 10

Keys to Success

1. Conduct appropriate site preparation prior to seeding, ensure all existing vegetation is dead
2. Utilize high-quality seed and plants from a trusted source
3. Seeding should result in 110 – 130 seeds per square foot or more
4. Ensure good seed-to-soil contact is achieved, never try to rake seed into existing vegetation
5. Cover crop should be Seed Oats or ReGreen only, Annual Rye Grass should NEVER be utilized as cover crop
6. Fall seeding typically results in higher wildflower production, whereas spring seeding typically results in better native grass establishment
7. When seeding in the fall on any type of bare soil utilize an erosion control blanket

Natural Areas Stewardship Primer

There is no more important a task in Natural Areas restoration than stewardship. Stewardship is to Natural Areas what Landscape Maintenance is to traditional landscape. Without stewardship a natural areas restoration will fail and with inadequate stewardship a natural areas restoration will fail. Because of its importance we highly recommend that stewardship be conducted by a professional ecological restoration firm, particularly during the 3-5 year establishment period after restoration efforts. Alternately IMSA staff may be trained and equipped to conduct appropriate stewardship, however during this training period a professional firm should be employed to oversee the stewardship and assist with training. Students/Volunteers can and should be involved in the stewardship process; however we do not recommend a stewardship program that depends upon student/volunteer efforts. Student involvement and volunteerism in regards to stewardship should be considered an educational or community strengthening exercise that supplements a permanent and structured stewardship program.

The stewardship program must be aggressive, dynamic, and site-driven. Stewardship actions typically consist of mowing, selective herbicide applications, seed collection & supplemental seeding/planting, prescribed fire, and monitoring. A good quote regarding stewardship is "It's not about making native plants grow, it's about making non-native plants not grow". The basic premise is that our native plants evolved here, they are meant to be here and they will grow just fine if we give them the opportunity. Because our native plants evolved here they are genetically encoded to survive drought, fire, and extreme cold. One of the ways they manage to survive under these conditions is by developing that deep, extensive root system that we associate with our native plant species. A young high-quality native seedling expends much of its energy developing their root system throughout the first 2-3 growing seasons. This native seedling may only be 3-6" above ground, but may already have a 12-24" deep root system [Figure 8]. Alternately, weedy species such as Giant Ragweed can grow 9 foot high in a single season. Obviously if we don't keep the Ragweed cut to a 6" height throughout the growing season our native seedlings won't stand much of a chance for survival.

MOWING [Figure 12]: Mowing is typically conducted by tractor with a large mowing implement keeping the vegetation cut to a height of 6-8" throughout the first growing season and a height of 10-12" throughout the second growing season. During the first two years of restoration the main reason for mowing is to allow sufficient light to the small native seedlings. If the site is inaccessible by mower it can be mown by hand with push mowers and/or brush cutters. Invasive and weedy species should not be allowed to reproduce on site at any time, mowing and/or hand pulling these plants before they are able to set seed is an efficient method of removal. Hand pulling is an activity that can be conducted easily and safely by student/volunteer groups. By not allowing these species to set seed, annual and biennial species can be effectively eradicated from the site in 2-3 years time. The spread of perennial species can be slowed and somewhat controlled by this method in most cases, however herbicide application is the only way to eradicate perennial plants. Some invasive species, such as Canada Thistle, spread by underground rhizomes (roots) and will continue to colonize even if not allowed to set seed. Mowing also includes cutting and treating woody plant material as explained in the Site Preparation section.

MONITORING: Natural areas monitoring is a very helpful tool in tracking the progress of a restoration or the health of an established natural area. Based on the data gathered an annual report can be formulated to inform the Academy on current conditions, potential problems, and recommendations for improvement. Monitoring and reporting are prime activities for student and faculty involvement.

HERBICIDE APPLICATION [Figure 14]: When applied in accordance to the manufacturer's recommendations by a certified herbicide applicator who has been trained in plant identification, herbicide has proven to be a safe and extremely effective tool for natural areas stewardship. Herbicides come in either selective or non-selective products. Selective herbicides only affect certain types of plants, i.e. only broadleaf plants, only grasses, etc. Non-selective herbicides affect any plant that it is applied to, regardless of type. The standard application method of both types of herbicide for stewardship is by backpack sprayer. An even more selective method of application is hand-wicking, a process where the applicator wears a rubber glove under a cotton exterior glove onto which herbicide is applied. The applicator then applies the herbicide to individual plants by grasping them with a saturated glove. This is an extremely effective application method for Cattails. A colored dye should be added to any herbicide that is to be applied within a natural area. This allows the applicator to see where they have applied the herbicide so they do not over apply. It also allows the owner to see where the herbicides have been applied, including any overspray.


Figure 12


Figure 12

Figure 13

SEED COLLECTION & SUPPLEMENTAL SEEDING/PLANTING: Supplemental seeding or planting may be necessary in areas where the original restoration seeding did not perform, to improve plant diversity, to replace plants killed by herbicide application, or after a natural disturbance such as flooding. Anytime there is a void created it should be filled with native species, if we don't fill the void Mother Nature will…likely with weedy species that take advantage of disturbances, such as Giant Ragweed. Once a natural area becomes established seed collection should become a regular part of stewardship. Native seed should be collected at appropriate times (May/June for Sedges, Fall for most other species). Disperse collected seed over the site after the prescribed fire is conducted and/or utilize it to fill any voids. Seed collection and dispersal is an activity that can be conducted easily and safely by student/volunteer groups.

PRESCRIBED FIRE [Figure 13]: Fire was a frequent part of pre-settlement native ecosystems and served to maintain the integrity of our natural areas by stimulating plant growth, preventing brush encroachment, and recycling nutrients. In ecosystem restoration, prescribed fire will perform these ancient functions while helping to manage many invasive species. Newly seeded areas should be allowed to establish for 2-3 growing seasons prior to prescribed fire application. Prescribed fires are typically conducted between the months of November and April, however the fire should be planned to minimize impact on nesting birds and migratory wildlife. We recommend that when areas become burnable that the entire area be burned annually for 5-7 years to aid in plant establishment. Once the area is well established an alternating burn schedule can be implemented in order to maintain un-burned areas for wildlife refuge. Prescribed fire should be conducted by highly trained personnel with appropriate permits and following an approved burn plan. We recommend that all personnel on the burn line be certified through the National Wildfire Coordinating Group's (NWCG) S130/S190 training. The burn boss should have additional training in ignitions and fire behavior as well as extensive prior burn experience. Students/Volunteers can be utilized on the burn line if they have the proper training and equipment, including Personal Protective Equipment; otherwise students/volunteers should always be welcome as smoke monitors.

Keys to Success

1. The typical establishment period for a seeded natural area is 3-5 years, stewardship efforts will be elevated during this time but should begin to taper off after the third year
2. Stewardship is all about weed control…know the common weeds and how to kill them and/or how to keep them from reproducing (i.e. timed mowings)
3. When contracting out natural areas restoration, require the installation contractor to steward the natural area until they meet a set performance criteria in the third or fifth year

Plant & Seed Mixes

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Transitional Buffer Seed Mix (Mesic-Wet Soils)

MIX STATISTICS

Base Mix Without Supplimental Plugs

Average Mix Height	2.23'
Median Mix Height	3.00'
Mix Height Mode (# of Occurances in Mix)	3' (2), 2.5' (1), 0.5" (1)
Number of Native Species in Mix	4
Lbs/Acre of ***Native Seed***	38.00
Propegules per Square Foot	222.30
Native FQI	7.5
Native Mean C Value	3.8
Native Mean W Value	2
National Wetland Category	Facultative (+) - Equally likely to occur in wetlands or uplands (estimated 34% - 66% probability). The "-" sign denotes that this mix generally has a lesser estimated probability of occurring in wetlands than the "Facultative Wetland" general indicator, but a greater estimated probablity of occurring in wetlands than a mix having the "Facultative" general indicator.

Mix Description: Pizzo's Transitional Buffer Mix is designed as a short-grass native planting that can be installed between low, flat areas (turf grass areas, sidewalks, etc.) and the taller, more diverse prairie areas. Providing this buffer achieves multiple things; 1.) Since some taller prairie species can "flop" and/or look "leggy" at the base, this short-grass buffer provides space so that taller plants will not flop onto the lawn or pavement, and it will also provide a visual screen to the lower, unattractive portion of the prairie; 2.) This buffer is easy to maintain with broadleaf herbicides, which gives a neat, "cared for" appearance that establishes a defined edge to the prairie; and 3.) Provids an all-grass buffer between lawn and prairie that will protect the broadleaf wildflowers in the prairie from annual "ween'n'feed" applications (which contain a broadleaf herbicide) to the lawn. The grasses in this mix are warm-season grasses, which means they will go dormant (turn golden brown) in the fall. Seeding of this mix should ***only*** occur in spring (typically before June 15th).

Grasses, Sedges, & Rushes (Monocots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT (Min-Max (Typical))	COLOR	BLOOM TIME (A M J J A S O)	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
ANDSCO	*Andropogon scoparius*	LITTLE BLUESTEM GRASS	5	4	FACU-	2-3' (3')	N/A		15,000	320.0000	20.00	52.63%	49.57%
BOUCUR	*Bouteloua curtipendula*	SIDE-OATS GRAMA	8	5	UPL	2-3' (2.5')	N/A		6,000	240.0000	15.00	39.47%	14.87%
BUCDAC	*Buchloe dactyloides*' BOWIE'	BOWIE BUFFALO GRASS	0	4	FUPL-	6-8" (5")	N/A		57,600	32.0000	2.00	5.26%	19.04%
CXVULP	*Carex vulpinoidea*	BROWN FOX SEDGE	2	-5	OBL	2-4' (3')	N/A		100,000	16.0000	1.00	2.63%	16.52%
									Monocot Subtotals			**38.00**	**100.00%**	**100.00%**
									Dicot Subtotals			**0.00**	**0.00%**	**0.00%**
									BASE MIX TOTALS			**38.00**	**100.00%**	**100.00%**

Notes:
1.) Pizzo recommends installing a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre
2.) For spring planting, Pizzo recommends installing a cover crop of Seed Oats (*Avena sativa*) with the above seed mix at 40 lbs/acre
3.) For fall planting, Pizzo recommends installin a cover crop of ReGreen (a Winter Wheat x Wheatgrass Sterile Hybrid) with the above mix at 50 lbs/acre
4.) **At no time should Annual *nor* Perennial Rye (*Lolium multiflorum or perenne*) be utilized as a cover crop**

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Transitional Buffer Seed Mix (Dry - Mesic Soils)

MIX STATISTICS

Base Mix Without Supplimental Plugs

Average Mix Height	1.46'
Median Mix Height	n/a
Mix Height Mode (# of Occurances in Mix)	2.5' (1), 0.5" (1)
Number of Native Species in Mix	2
Lbs/Acre of ***Native Seed***	62.00
Propegules per Square Foot	174.55
Native FQI	5.7
Native Mean C Value	4
Native Mean W Value	4.5
National Wetland Category	Obligate Upland - Occurs almost never in wetlands under natural conditions (estimated <1% probability).

Mix Description: Pizzo's Transitional Buffer Mix is designed as a short-grass native planting that can be installed between low, flat areas (turf grass areas, sidewalks, etc.) and the taller, more diverse prairie areas. Providing this buffer achieves multiple things; 1.) Since some taller prairie species can "flop" and/or look "leggy" at the base, this short-grass buffer provides space so that taller plants will not flop onto the lawn or pavement, and it will also provide a visual screen to the lower, unattractive portion of the prairie; 2.) This buffer is easy to maintain with broadleaf herbicides, which gives a neat, "cared for" appearance that establishes a defined edge to the prairie; and 3.) Provids an all-grass buffer between lawn and prairie that will protect the broadleaf wildflowers in the prairie from annual "ween'n'feed" applications (which contain a broadleaf herbicide) to the lawn. The grasses in this mix are warm-season grasses, which means they will go dormant (turn golden brown) in the fall. Seeding of this mix should only occur in spring (typically before June 15th).

Grasses, Sedges, & Rushes (Monocots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT (Min-Max (Typical))	COLOR	BLOOM TIME (A M J J A S O)	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
BOUCUR	*Bouteloua curtipendula*	SIDE-OATS GRAMA	8	5	UPL	2-3' (2.5')	N/A		6,000	960.0000	60.00	96.77%	75.76%
BUCDAC	*Buchloe dactyloides*' BOWIE'	BOWIE BUFFALO GRASS	0	4	FUPL-	6-8" (5")	N/A		57,600	32.0000	2.00	3.23%	24.24%
									Monocot Subtotals			62.00	100.00%	100.00%
									Dicot Subtotals			0.00	0.00%	0.00%
									BASE MIX TOTALS			62.00	100.00%	100.00%

Notes:
1.) Pizzo recommends installing a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre
2.) For spring planting, Pizzo recommends installing a cover crop of Seed Oats (*Avena sativa*) with the above seed mix at 40 lbs/acre
3.) **At no time should Annual *nor* Perennial Rye (*Lolium multiflorum or perenne*) be utilized as a cover crop**

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Emergent Seed Mix (2-6" Water Depth)

MIX STATISTICS

Base Mix Without Supplimental Plugs

Average Mix Height	3.22'
Median Mix Height	3.00'
Mix Height Mode (# of Occurances in Mix)	3.0' (12), 2.0' (6), 4.0' (4), 5.0' (3), 5.5' (1), 2.5' (1)
Number of Native Species in Mix	27
Lbs/Acre of ***Native Seed***	6.36
Propegules per Square Foot	229.51
Native FQI	28.5
Native Mean C Value	5.5
Native Mean W Value	-5.0
National Wetland Category	Obligate Wetland - Occurs almost always in wetlands under natureal conditions (estimated >99% probability)

Mix Description: Pizzo's Emergent Seed Mix is designed to grow in shallow water 2" to 6" deep. It is ideal for shallow water wetlands and within the emergent zone of a pond or stream shoreline. Over 73% of the seeds in this mix are Sedge or Sedge-like species. To compliment this dark green aesthetic over 26% of the mix composed of wildflowers, which provide an array of blooms from May through October. This emergent mix will result in a medium-tall profile with under 44% of seeds typically averaging 3.0' high or less and over 20% of seeds typically averaging 5.0' high or more at maturity. To achieve appropriate seed-to-soil contact for germination this mix must be planted prior to establishing normal water levels, or the water body must be drained in order to expose the soil within the targeted seeding area prior to seeding. We recommend installing appropriate temporary erosion control blanket over areas seeded with this mix. The Emergent seed mix can be supplemented with the recommended plug list provided below to add diversity, color, and resilience to the long-term health of your wetland.

Grasses, Sedges, & Rushes (Monocots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT (Min-Max (Typical))	COLOR	BLOOM TIME (A M J J A S O)	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
CXCOMO	*Carex comosa*	BRISTLY SEDGE	5	-5	OBL	1-3' (2')	N/A		30,000	6.0000	0.38	5.90%	1.80%
CXHYST	*Carex hystericina*	PORCUPINE SEDGE	5	-5	OBL	2-4' (3')	N/A		30,000	2.0000	0.13	1.97%	0.60%
CXLACU	*Carex lacustris*	COMMON LAKE SEDGE	6	-5	OBL	2-4' (3')	N/A		11,000	2.5000	0.16	2.46%	0.28%
CXLURI	*Carex lurida*	BOTTLEBRUSH SEDGE	8	-5	OBL	2-4' (3')	N/A		12,000	2.0000	0.13	1.97%	0.24%
CXSTRI	*Carex stricta*	COMMON TUSSOCK SEDGE	5	-5	OBL	2-4' (3')	N/A		53,000	1.0000	0.06	0.98%	0.53%
CXVULP	*Carex vulpinoidea*	BROWN FOX SEDGE	2	-5	OBL	2-4' (3')	N/A		100,000	4.0000	0.25	3.93%	4.00%
ELEERY	*Eleocharis erythropoda*	RED-ROOTED SPIKE RUSH	2	-5	OBL	2-4' (3')	N/A		78000	1.0000	0.06	0.98%	0.78%
JUNEFF	*Juncus effusus*	COMMON RUSH	7	-5	OBL	1-3' (2')	N/A		1,000,000	1.0000	0.06	0.98%	10.00%
LEEORY	*Leersia oryzoides*	RICE CUT GRASS	4	-5	OBL	3-5' (4')	N/A		34,000	6.0000	0.38	5.90%	2.04%
SCIATR	*Scirpus atrovirens*	DARK GREEN RUSH	4	-5	OBL	3-6' (5')	N/A		460,000	4.0000	0.25	3.93%	18.40%
SCICYP	*Scirpus cyperinus*	WOOL GRASS	6	-5	OBL	3-5' (4')	N/A		1,700,000	2.0000	0.13	1.97%	34.01%
SCIVAC	*Scirpus validus creber*	GREAT BULRUSH	5	-5	OBL	4-7' (5.5')	N/A		31,000	4.0000	0.25	3.93%	1.24%
									Monocot Subtotals			**2.22**	**34.89%**	**73.92%**

Flowers & Other Broadleaves (Dicots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT (Min-Max (Typical))	COLOR	BLOOM TIME (A M J J A S O)	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
ACOCAL	*Acorus calamus*	SWEET FLAG	7	-5	OBL	1-3' (2')	Green		6,600	12.0000	0.75	11.79%	0.79%
ALISUB	*Alisma subcordatum*	COMMON WATER PLANTAIN	4	-5	OBL	1-3' (2')	White		60,000	4.0000	0.25	3.93%	2.40%
ASCINC	*Asclepias incarnata*	SWAMP MILKWEED	4	-5	OBL	3-5' (4')	Magenta		4,800	4.0000	0.25	3.93%	0.19%
BIDCER	*Bidens cernua*	NODDING BUR MARIGOLD	5	-5	OBL	2-4' (3')	Yellow		21,000	4.0000	0.25	3.93%	0.84%
BIDCOR	*Bidens coronata*	TALL SWAMP MARIGOLD	9	-5	OBL	3-5' (4')	Yellow		6,500	2.0000	0.13	1.97%	0.13%
EUPMAM	*Eupatorium maculatum*	SPOTTED JOE PYE WEED	4	-5	OBL	4-7' (5')	Pink		95,000	0.7500	0.05	0.74%	0.71%
HIBLAE	*Hibiscus laevis*	HALBERD-LEAVED ROSE MALLOW	6	-5	OBL	3-6' (5')	Pink		2,800	3.5000	0.22	3.44%	0.10%
IRIVIS	*Iris virginica shrevei*	BLUE FLAG	5	-5	OBL	2-4' (3')	Blue		1,000	14.0000	0.88	13.76%	0.14%
LUDALT	*Ludwigia alternifolia*	SEEDBOX	6	-5	OBL	2-4' (3')	Yellow		1,300,000	0.1250	0.01	0.12%	1.63%
LYCAME	*Lycopus americanus*	COMMON WATER HOREHOUND	5	-5	OBL	1-3' (2')	White		130,000	0.2500	0.02	0.25%	0.33%
LYTALA	*Lythrum alatum*	WINGED LOOSESTRIFE	7	-5	OBL	2-4' (3')	Purple		3,000,000	0.1250	0.01	0.12%	3.75%
MIMRIN	*Mimulus ringens*	MONKEY FLOWER	6	-5	OBL	2-4' (2.5')	Purple		2,300,000	0.5000	0.03	0.49%	11.50%
PONCOR	*Pontederia cordata*	PICKEREL WEED	10	-5	OBL	1-3' (2')	Purple		1,250	16.0000	1.00	15.72%	0.20%
SAGLAT	*Sagittaria latifolia*	COMMON ARROWHEAD	4	-5	OBL	2-4' (3')	White		61,000	4.0000	0.25	3.93%	2.44%
SOLRID	*Solidago riddellii*	RIDDELL'S GOLDENROD	7	-5	OBL	2-4' (3')	Yellow		93,000	1.0000	0.06	0.98%	0.93%
									Dicot Subtotals			**4.14**	**65.11%**	**26.08%**
									BASE MIX TOTALS			**6.36**	**100.00%**	**100.00%**

Recommended Plug Species to Supplment Emergent Seed Mix

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT (Min-Max (Typical))	COLOR	BLOOM TIME (A M J J A S O)	PLUGS/FLAT	FLATS/ ACRE	PLUGS/ ACRE	PLUGS/ SF	% OF MIX by Seed Count
CXEMOR	*Carex emoryi*	RIVERBANK SEDGE (5)	6	-5	OBL	2-4' (3')	N/A		38	43.0	1,634.00	0.04	0.02%
LOBCAR	*Lobelia cardinalis*	CARDINAL FLOWER (1, 2, 4)	7	-5	OBL	3-5' (4')	Red		38	43.0	1,634.00	0.04	0.02%
PELVIR	*Peltandra virginica*	ARROW ARUM (2, 3)	10	-5	OBL	2-5' (4')	Green		38	86.0	3,268.00	0.08	0.03%
SPAEUR	*Sparganium eurycarpum*	COMMON BUR REED (1)	6	-5	OBL	3-5' (4')	White		38	86.0	3,268.00	0.08	0.03%
										258.0	9,804.00	0.23	0.10%

SUPPLIMENTED MIX STATISTICS

Base Seed Mix Including Supplimental Plugs

Number of Native Species in Mix	31
Native FQI	31.8
Native Mean C Value	5.7
Native Mean W Value	-5.0
National Wetland Category	Obligate Wetland - Occurs almost always in wetlands under natureal conditions (estimated >99% probability)

Some species are not appropriate for inclusion into a seed mix, however they may be very desirable to have as part of the permanent plant matrix because of their ecological, habitat, and/or aesthetic value. The plug species listed above are appropriate for supplementing this seed mix. Following are the common reasons for not including these species within the seed mix: 1-Does not germinate well from seed in the field, 2-Seed is very expensive, 3-Low number of seeds per ounce, 4-Requires specialized microclimate, 5-Seed is not commercially available or is only available in small quantities

Notes:
1.) Pizzo recommends installing a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre
2.) For spring planting, Pizzo recommends installing a cover crop of Seed Oats (*Avena sativa*) with the above seed mix at 40 lbs/acre
3.) For fall planting, Pizzo recommends installin a cover crop of ReGreen (a Winter Wheat x Wheatgrass Sterile Hybrid) with the above mix at 50 lbs/acre
4.) **At no time should Annual *nor* Perennial Rye (*Lolium multiflorum or perenne*) be utilized as a cover crop**

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Low Profile Prairie Seed Mix (Mesic Soils)

MIX STATISTICS

Base Mix Without Supplimental Plugs	
Average Mix Height	3.23'
Median Mix Height	3.00'
Mix Height Mode (# of Occurances in Mix)	3.0' (13), 4.0' (9), 2.0' (9), 2.5' (3), 3.5' (3), 5.0' (3), 1.5' (2)
Number of Native Species in Mix	40
lbs/Acre of ***Native Seed***	27.52
Propegules per Square Foot	125.27
Native FQI	38.3
Native Mean C Value	6.1
Native Mean W Value	3.2
National Wetland Category	Facultative Upland - Occasionally occurs in wetlands, but usually occur in non-wetlands (estimated 1% - 33% probability)

Mix Description: Pizzo's Low Profile Prairie Seed Mix is designed for sunny areas that remain mesic-dry for most of the growing season. This mix is composed of a diverse collection of shorter-profile prairie grass and wildflower species, and is ideal for areas where taller vegetation is not appropriate. Over 82% of the seeds in this mix typically grow to an average high of 3' or less and over 48% of the mix is composed of wildflowers that will provide an array of blooms from April through October. When installed and maintained correctly this mix will typically begin flowering in it's second growing season, starting with the yellow blooms of annual Partridge Pea and biennial Black-Eyed Susan, with additional more colorful permanent species appearing in years 3-5. This mix can be supplemented with the recommended plug list provided below to add diversity, color, and resilience to the long-term health of your prairie.

Grasses, Sedges, & Rushes (Monocots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
ANDSCO	*Andropogon scoparius*	LITTLE BLUESTEM GRASS	5	4	FACU-	2-3' (3')	N/A								15,000	96.0000	6.00	21.80%	26.39%
BOUCUR	*Bouteloua curtipendula*	SIDE-OATS GRAMA	8	5	UPL	2-3' (2.5')	N/A								6,000	192.0000	12.00	43.60%	21.11%
ELYCAN	*Elymus canadensis*	CANADA WILD RYE	4	1	FAC-	2-5' (3.5')	N/A								5,200	16.0000	1.00	3.63%	1.52%
PANVIR	*Panicum virgatum*	SWITCH GRASS	5	-1	FAC+	3-5' (4')	N/A								14,000	8.0000	0.50	1.82%	2.05%
															Monocot Subtotals		**19.50**	**70.85%**	**51.08%**

Flowers & Other Broadleaves (Dicots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
ALLCER	*Allium cernuum*	NODDING WILD ONION	7	1	[FAC-]	1-2' (1.5')	Pink								7,600	3.0000	0.19	0.68%	0.42%
AMOCAN	*Amorpha canescens*	LEAD PLANT	9	5	UPL	1-3.5' (3')	Purple								16,000	1.0000	0.06	0.23%	0.29%
ASCTUB	*Asclepias tuberosa*	BUTTERFLY WEED	7	5	UPL	1-3.5' (2.5')	Orange								4,300	8.0000	0.50	1.82%	0.63%
ASTAZU	*Aster azureus*	SKY-BLUE ASTER	8	5	UPL	2-5' (3')	Blue								80,000	1.0000	0.06	0.23%	1.47%
ASTERI	*Aster ericoides*	HEATH ASTER	5	4	FACU-	1-3' (2')	White								200,000	0.2500	0.02	0.06%	0.92%
ASTLAE	*Aster laevis*	SMOOTH BLUE ASTER	9	5	UPL	2.5-5' (4')	Blue								55,000	1.0000	0.06	0.23%	1.01%
ASTCAN	*Astragalus canadensis*	CANADIAN MILK VETCH	8	5	[UPL]	2-4' (3')	Cream								17,000	1.0000	0.06	0.23%	0.31%
BAPLEA	*Baptisia leucantha*	WHITE WILD INDIGO	8	2	FACU+	2-5' (4')	White								1,700	4.0000	0.25	0.91%	0.12%
CASFAS	*Cassia fasciculata*	PARTRIDGE PEA	5	4	FACU-	1-3' (2')	Yellow								2,700	16.0000	1.00	3.63%	0.79%
CORPAL	*Coreopsis palmata*	PRAIRIE COREOPSIS	6	5	UPL	1-2.5' (2')	Yellow								10,000	4.0000	0.25	0.91%	0.73%
DESILL	*Desmanthus illinoensis*	ILLINOIS SENSITIVE PLANT	3	5	UPL	2-5' (4')	Yellow								4,200	1.5000	0.09	0.34%	0.12%
DESCAN	*Desmodium canadense*	SHOWY TICK TREFOIL	4	1	FAC-	3-6' (5')	Purple								5,500	1.0000	0.06	0.23%	0.10%
ECHPAL	*Echinacea pallida*	PALE PURPLE CONEFLOWER	8	5	UPL	2-4' (3')	Pink								5,200	8.0000	0.50	1.82%	0.76%
ECHPUR	*Echinacea purpurea*	PURPLE CONEFLOWER	3	5	UPL	2-5' (4')	Purple								6,600	16.0000	1.00	3.63%	1.94%
ERYYUC	*Eryngium yuccifolium*	RATTLESNAKE MASTER	9	-1	FAC+	2-5' (4')	White								7,500	6.0000	0.38	1.36%	0.82%
EUPCOR	*Euphorbia corollata*	FLOWERING SPURGE	2	5	UPL	1-4' (3')	White								8,000	1.0000	0.06	0.23%	0.15%
HELHEL	*Heliopsis helianthoides*	FALSE SUNFLOWER	5	5	UPL	3-6' (5')	Yellow								6,300	4.0000	0.25	0.91%	0.46%
LESCAP	*Lespedeza capitata*	ROUND-HEADED BUSH CLOVER	4	3	FACU	2-4' (3')	Green								8,000	2.0000	0.13	0.45%	0.29%
LIASPI	*Liatris aspera*	ROUGH BLAZING STAR	6	5	UPL	2.5-5' (3')	Purple								16,000	4.0000	0.25	0.91%	1.17%
MONFIS	*Monarda fistulosa*	WILD BERGAMOT	4	3	FACU	3-5' (4')	Purple								70,000	1.0000	0.06	0.23%	1.28%
PARINT	*Parthenium integrifolium*	WILD QUININE	8	5	UPL	3-5' (4')	White								7,000	2.0000	0.13	0.45%	0.26%
PENDIG	*Penstemon digitalis*	FOXGLOVE BEARD TONGUE	4	1	FAC-	2.5-5' (3.5')	White								130,000	3.0000	0.19	0.68%	7.15%
PETPUR	*Petalostemum purpureum*	PURPLE PRAIRIE CLOVER	9	5	UPL	1.5-3' (2')	Purple								15,000	6.0000	0.38	1.36%	1.65%
PHLPIP	*Phlox pilosa*	SAND PRAIRIE PHLOX	7	1	FAC-	1-3' (2')	Pink								19,000	0.5000	0.03	0.11%	0.17%
POTARU	*Potentilla arguta*	PRAIRIE CINQUEFOIL	9	4	FACU-	1-3' (2')	Yellow								230,000	0.1250	0.01	0.03%	0.53%
PYCTEN	*Pycnanthemum tenuifolium*	SLENDER MOUNTAIN MINT	7	0	FAC	1-3' (2')	White								220,000	0.2500	0.02	0.06%	1.01%
RUDHIR	*Rudbeckia hirta*	BLACK-EYED SUSAN	1	3	FACU	2-3' (2.5')	Yellow								92,000	8.0000	0.50	1.82%	13.49%
RUDSPS	*Rudbeckia speciosa sullivantii*	SHOWY BLACK-EYED SUSAN	8	-3	[FACW]	2-4' (3')	Yellow								27,100	10.0000	0.63	2.27%	4.97%
RUDSUB	*Rudbeckia subtomentosa*	SWEET BLACK-EYED SUSAN	9	2	FACU+	3-6' (5')	Yellow								43,000	1.0000	0.06	0.23%	0.79%
SOLRIG	*Solidago juncea*	EARLY GOLDENROD	5	5	UPL	2-4' (3')	Yellow								290,000	0.2500	0.02	0.06%	1.33%
SOLRIG	*Solidago rigida*	STIFF GOLDENROD	4	4	FACU-	3-6' (4')	Yellow								41,000	0.5000	0.03	0.11%	0.38%
TRAOHI	*Tradescantia ohiensis*	COMMON SPIDERWORT	2	2	FACU+	2-4' (3')	Blue								8,000	3.0000	0.19	0.68%	0.44%
VERSTR	*Verbena stricta*	HOARY VERVAIN	4	5	UPL	1-3' (2')	Blue								28,000	3.0000	0.19	0.68%	1.54%
ZIZAPT	*Zizia aptera*	HEART-LEAVED MEADOW PARSNIP	10	3	FACU	1-3' (2')	Yellow								12,000	2.0000	0.13	0.45%	0.44%
ZIZAUR	*Zizia aurea*	GOLDEN ALEXANDERS	7	-1	FAC+	2-4' (3')	Yellow								11,000	5.0000	0.31	1.14%	1.01%
															Dicot Subtotals		**8.02**	**29.15%**	**48.92%**
															BASE MIX TOTALS		**27.52**	**100.00%**	**100.00%**

Recommended Plug Species to Supplliment Low Profile Prairie Seed Mix

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	PLUGS/FLAT	FLATS/ ACRE	PLUGS/ ACRE	PLUGS/ SF	% OF MIX by Seed Count
ANECAN	*Anemone canadensis*	MEADOW ANEMONE (1, 3)	4	-3	FACW	1-2' (1.5')	White								38	43.0	1,634.00	0.04	0.03%
ASCVER	*Asclepias verticillata*	WHORLED MILKWEED (2, 3)	1	5	UPL	1-2' (1.5')	White								38	20.0	760.00	0.02	0.01%
BAPLEO	*Baptisia leucophaea*	CREAM WILD INDIGO (1, 2, 3)	10	5	UPL	1-3' (2')	Cream								38	20.0	760.00	0.02	0.01%
CEAAME	*Ceanothus americanus*	NEW JERSEY TEA (1, 3)	6	5	UPL	1-3' (2')	White								38	15.0	570.00	0.01	0.01%
DODMEA	*Dodecatheon meadia*	SHOOTING STAR (1, 2)	6	3	FACU	1-2' (1.5')	Pink								38	86.0	3,268.00	0.08	0.06%
GENAND	*Gentiana andrewsii*	BOTTLE GENTIAN (1, 2, 4)	8	-3	FACW	1-3' (2')	Blue								38	20.0	760.00	0.02	0.01%
GENFLA	*Gentiana flavida*	YELLOWISH GENTIAN (1, 4)	9	3	FACU	2-4' (3')	Cream								38	15.0	570.00	0.01	0.01%
GENPUB	*Gentiana puberulenta*	PRAIRIE GENTIAN (1, 2, 4, 5)	10	5	UPL	6"-2' (1')	Blue								38	15.0	570.00	0.01	0.01%
GEUTRI	*Geum triflorum*	PRAIRIE SMOKE (1, 2)	10	5	[UPL]	6-12" (9")	Pink								38	86.0	3,268.00	0.08	0.06%
HEURIC	*Heuchera richardsonii*	PRAIRIE ALUM ROOT (1, 2)	8	1	FAC-	1-3' (2')	Green								38	20.0	760.00	0.02	0.01%
LIAPYC	*Liatris pycnostachya*	PRAIRIE BLAZING STAR (1, 2)	8	1	FAC-	1-2' (1.5')	Magenta								38	86.0	3,268.00	0.08	0.06%
PENPAL	*Penstemon pallidus*	PALE BEARD TONGUE (5)	6	5	UPL	1-2' (1')	Cream								38	20.0	760.00	0.02	0.01%
HEURIC	*Heuchera richardsonii*	PRAIRIE ALUM ROOT (1, 2)	8	1	FAC-	1-3' (2')	Green								38	20.0	760.00	0.02	0.01%
LIAPYC	*Liatris pycnostachya*	PRAIRIE BLAZING STAR (1, 2)	8	1	FAC-	1-2' (1.5')	Magenta								38	86.0	3,268.00	0.08	0.06%
PENPAL	*Penstemon pallidus*	PALE BEARD TONGUE (5)	6	5	UPL	1-2' (1')	Cream								38	20.0	760.00	0.02	0.01%
ROSBLA	*Rosa blanda*	EARLY WILD ROSE (1, 3)	5	3	FACU	3-6' (5')	Pink								1	15.0	15.00	0.00	0.00%
ROSCAR	*Rosa carolina*	PASTURE ROSE (1, 3)	5	4	FACU-	1-3' (2')	Pink								1	25.0	25.00	0.00	0.00%
RUEHUM	*Ruellia humilis*	HAIRY RUELLIA (3)	7	4	FACU-	6-12" (9")	Purple								38	20.0	760.00	0.02	0.01%
SISALB	*Sisyrinchium albidum*	COMMON BLUE-EYED GRASS (2)	7	3	FACU	4-9" (6")	Blue								38	43.0	1,634.00	0.04	0.03%
SPOHET	*Sporobolus heterolepis*	PRAIRIE DROPSEED (1, 2)	10	4	FACU-	1-2.5' (2')	N/A								38	86.0	3,268.00	0.08	0.06%
VERVIR	*Veronicastrum virginicum*	CULVER'S ROOT (1)	7	0	FAC	2-5' (3')	White								38	43.0	1,634.00	0.04	0.03%
VIOPEL	*Viola pedata linearioloba*	BIRD'S FOOT VIOLET (1, 5)	9	5	UPL	2-6" (3")	Purple								38	86.0	3,268.00	0.08	0.06%
															764.0	27,552.00	0.11		0.50%

SUPPLIMENTED MIX STATISTICS

Base Seed Mix Including Supplimental Plugs	
Number of Native Species in Mix	59
Native FQI	49.2
Native Mean C Value	6.4
Native Mean W Value	3.1
National Wetland Category	Facultative Upland - Occasionally occurs in wetlands, but usually occur in non-wetlands (estimated 1% - 33% propability)

Some species are not appropriate for inclusion into a seed mix, however they may be very desirable to have as part of the permanent plant matrix because of their ecological, habitat, and/or aesthetic value. The plug species listed above are appropriate for supplementing this seed mix. Following are the common reasons for not including these species within the seed mix: 1-Does not germinate well from seed in the field, 2-Seed is very expensive, 3-Low number of seeds per ounce, 4-Requires specialized microclimate, 5-Seed is not commercially available or is only available in small quantaties

Notes:

1.) Pizzo recommends installing a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre
2.) For spring planting, Pizzo recommends installing a cover crop of Seed Oats (*Avena sativa*) with the above seed mix at 40 lbs/acre
3.) For fall planting, Pizzo recommends installin a cover crop of ReGreen (a Winter Wheat x Wheatgrass Sterile Hybrid) with the above mix at 50 lbs/acre
4.) **At no time should Annual *nor* Perennial Rye (*Lolium multiflorum or perenne*) be utilized as a cover crop**

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Savanna Seed Mix (Mesic Soils)

MIX STATISTICS

Base Mix Without Supplimental Plugs	
Average Mix Height	3.12'
Median Mix Height	3.00'
Mix Height Mode (# of Occurances in Mix)	3.0' (14), 2.0' (9), 4.0' (4), 5.0 (3), 3.5' (3), 6.0' (2), 2.5' (2), 1.5' (2)
Number of Native Species in Mix	39
lbs/Acre of ***Native Seed***	22.33
Propegules per Square Foot	110.62
Native FQI	33.5
Native Mean C Value	5.4
Native Mean W Value	3.6
National Wetland Category	Facultative Upland (-) - Occasionally occurs in wetlands, but usually occur in non-wetlands (estimated 1% - 33% probability). The "-" sign denotes that this mix generally has a lesser estimated probability of occurring in

Mix Description: Pizzo's Savanna Seed Mix is designed for areas with scattered native trees (typically 5-7 trees/acre) that provide light - part shade and have soils that remain mesic - dry for most of the growing season. This mix will help establish a historic native ground plane when re-creating the picturesque open tree native savannas that were so heavily sought after by the pioneers as they made their way west. Over 47% of this mix is composed of wildflowers that will provide an array of blooms from April through October. This is a short - medium height prairie with over 71% of seeds typically averaging 3.0' high or less at maturity. Pizzo highly recommends that this seed mix be supplemented with the recommended plug list provided below to add diversity, color, and resilience to the long-term health of your savanna, especially in order to establish many of the spring ephemeral wildflowers historically associated with the savanna ecosystem.

Grasses, Sedges, & Rushes (Monocots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
ANDSCO	*Andropogon scoparius*	LITTLE BLUESTEM GRASS	5	4	FACU-	2-3' (3')	N/A								15,000	128.0000	8.00	35.83%	39.85%
ELYCAN	*Elymus canadensis*	CANADA WILD RYE	4	1	FAC-	2-5' (3.5')	N/A								5,200	64.0000	4.00	17.91%	6.91%
ELYVIR	*Elymus virginicus*	VIRGINIA WILD RYE	4	-2	FACW-	3-5' (4')	N/A								4,200	32.0000	2.00	8.96%	2.79%
HYSPAT	*Hystrix patula*	BOTTLEBRUSH GRASS	5	5	UPL	2.5'-5' (3.5')	N/A								7,600	16.0000	1.00	4.48%	2.52%
															Monocot Subtotals		**15.00**	**67.18%**	**52.07%**

Flowers & Other Broadleaves (Dicots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
ALLCAN	*Allium canadense*	WILD GARLIC	2	3	FACU	1-2' (1.5')	Pink								560	16.0000	1.00	4.48%	0.19%
ALLCER	*Allium cernuum*	NODDING WILD ONION	7	1	[FAC-]	1-2' (1.5')	Pink								7,600	2.0000	0.13	0.56%	0.32%
ANECYL	*Anemone cylindrica*	THIMBLEWEED	6	5	UPL	1-3' (2')	White								26,000	1.0000	0.06	0.28%	0.54%
AQUCAN	*Aquilegia canadensis*	WILD COLUMBINE	6	3	FAC-	2-4' (3')	Red								38,000	1.0000	0.06	0.28%	0.79%
ASCTUB	*Asclepias tuberosa*	BUTTERFLY WEED	7	5	UPL	1-3.5' (2.5')	Orange								4,300	4.0000	0.25	1.12%	0.36%
ASTAZU	*Aster azureus*	SKY-BLUE ASTER	8	5	UPL	2-5' (3')	Blue								80,000	2.0000	0.13	0.56%	3.32%
ASTLAE	*Aster laevis*	SMOOTH BLUE ASTER	9	5	UPL	2.5-5' (4')	Blue								55,000	0.2500	0.02	0.07%	0.29%
ASTSAS	*Aster sagittifolius*	ARROW-LEAVED ASTER	5	5	UPL	2-4' (3')	Blue								135,000	0.5000	0.03	0.14%	1.40%
ASTSHO	*Aster shortii*	SHORT'S ASTER	8	5	UPL	2-4' (3')	Blue								60,000	1.0000	0.06	0.28%	1.25%
CACATR	*Cacalia atriplicifolia*	PALE INDIAN PLANTAIN	8	5	UPL	4-8' (6')	White								6,000	1.0000	0.06	0.28%	0.12%
CORPAL	*Coreopsis palmata*	PRAIRIE COREOPSIS	6	5	UPL	1-2.5' (2')	Yellow								10,000	2.0000	0.13	0.56%	0.42%
DESGLU	*Desmodium glutinosum*	POINTED TICK TREFOIL	5	5	UPL	1-3' (2')	Pink								840	8.0000	0.50	2.24%	0.14%
ECHPUR	*Echinacea purpurea*	PURPLE CONEFLOWER	3	5	UPL	2-5' (4')	Purple								6,600	6.0000	0.38	1.68%	0.82%
EUPCOR	*Euphorbia corollata*	FLOWERING SPURGE	2	5	UPL	1-4' (3')	White								8,000	1.2500	0.08	0.35%	0.21%
GERMAC	*Geranium maculatum*	WILD GERANIUM	4	5	[UPL]	1-3' (2')	Purple								5,000	2.0000	0.13	0.56%	0.21%
HELDIV	*Helianthus divaricatus*	WOODLAND SUNFLOWER	5	5	UPL	4-7' (6')	Yellow								5,000	2.0000	0.13	0.56%	0.21%
HELSTR	*Helianthus strumosus*	PALE-LEAVED SUNFLOWER	5	5	UPL	2-4' (3')	Yellow								4,200	2.2500	0.14	0.63%	0.20%
LESCAP	*Lespedeza capitata*	ROUND-HEADED BUSH CLOVER	4	3	FACU	2-4' (3')	Green								8,000	1.2500	0.08	0.35%	0.21%
LIASPI	*Liatris aspera*	ROUGH BLAZING STAR	6	5	UPL	2.5-5' (3')	Purple								16,000	2.0000	0.13	0.56%	0.66%
MONFIS	*Monarda fistulosa*	WILD BERGAMOT	4	3	FACU	3-5' (4')	Purple								70,000	2.0000	0.13	0.56%	2.91%
MONPUN	*Monarda punctata*	HORSE MINT	5	5	UPL	1-3' (2')	Purple								90,000	1.0000	0.06	0.28%	1.87%
PENDIG	*Penstemon digitalis*	FOXGLOVE BEARD TONGUE	4	1	FAC-	2.5-5' (3.5')	White								130,000	1.5000	0.09	0.42%	4.05%
RATPIN	*Ratibida pinnata*	YELLOW CONEFLOWER	4	5	UPL	3-6' (5')	Yellow								30,000	6.0000	0.38	1.68%	3.74%
RUDSUB	*Rudbeckia subtomentosa*	SWEET BLACK-EYED SUSAN	9	2	FACU+	3-6' (5')	Yellow								43,000	2.0000	0.13	0.56%	1.78%
SILSTE	*Silene stellata*	STARRY CAMPION	6	5	UPL	2-4' (3')	White								30,000	1.5000	0.09	0.42%	0.93%
SMIRAC	*Smilacina racemosa*	FEATHERY FALSE SOLOMON'S SEAL	3	3	FACU	1-3' (2')	White								400	16.0000	1.00	4.48%	0.13%
SMISTE	*Smilacina stellata*	STARRY FALSE SOLOMON'S SEAL	5	1	FAC-	1-3' (2')	White								400	16.0000	1.00	4.48%	0.13%
SOLCAE	*Solidago caesia*	BLUE-STEMMED GOLDENROD	7	3	FACU	1-3' (2')	Yellow								545,000	1.2500	0.08	0.35%	14.14%
SOLRIG	*Solidago juncea*	EARLY GOLDENROD	5	5	UPL	2-4' (3')	Yellow								290,000	0.2500	0.02	0.07%	1.50%
SOLSPE	*Solidago speciosa*	SHOWY GOLDENROD	7	5	UPL	3-6' (5')	Yellow								95,000	1.0000	0.06	0.28%	1.97%
SOLULM	*Solidago ulmifolia*	ELM-LEAVED GOLDENROD	5	5	UPL	1-3' (2.5')	Yellow								130,000	0.2500	0.02	0.07%	0.67%
THADIO	*Thalictrum dioicum*	EARLY MEADOW RUE	7	2	FACU+	1-3' (2')	Green								7,300	4.0000	0.25	1.12%	0.61%
TRAOHI	*Tradescantia ohiensis*	COMMON SPIDERWORT	2	2	FACU+	2-4' (3')	Blue								8,000	3.0000	0.19	0.84%	0.56%
ZIZAUR	*Zizia aurea*	GOLDEN ALEXANDERS	7	-1	FAC+	2-4' (3')	Yellow								11,000	6.0000	0.38	1.68%	1.37%
															Dicot Subtotals		**7.33**	**32.82%**	**47.93%**
															BASE MIX TOTALS		**22.33**	**100.00%**	**100.00%**

Recommended Plug Species to Supplliment Savanna Seed Mix

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	PLUGS/FLAT	FLATS/ ACRE	PLUGS/ ACRE	PLUGS/ SF	% OF MIX by Seed Count
ANEVIR	*Anemone virginiana*	TALL ANEMONE (2, 3)	5	5	UPL	2-4' (3')	White								38	20.0	760.00	0.02	0.02%
ASTLIN	*Aster linariifolius*	FLAX-LEAVED ASTER (2, 3, 5)	10	5	UPL	1-2' (1')	Purple								38	20.0	760.00	0.02	0.02%
CARLAN	*Carex blanda*	COMMON WOOD SEDGE (5)	1	0	FAC	2-3' (2.5')	N/A								38	43.0	1,634.00	0.04	0.03%
CAREN5	*Carex pensylvanica*	COMMON OAK SEDGE (1, 2, 5)	5	5	UPL	6-12" (8")	N/A								38	86.0	3,268.00	0.08	0.07%
CARROSE	*Carex rosea*	CURLY-STYLED WOOD SEDGE (2)	4	5	UPL	1-2' (1')	N/A								38	43.0	1,634.00	0.04	0.03%
CEAAME	*Ceanothus americanus*	NEW JERSEY TEA (1, 3)	6	5	UPL	1-3' (2')	White								38	10.0	380.00	0.01	0.01%
DODMEA	*Dodecatheon meadia*	SHOOTING STAR (1, 2)	6	3	FACU	1-2' (1.5')	Pink								38	86.0	3,268.00	0.08	0.07%
ERYALB	*Erythronium albidum*	WHITE TROUT LILY (5)	5	5	UPL	4-8" (6")	White								38	86.0	3,268.00	0.08	0.07%
GENAND	*Gentiana andrewsii*	BOTTLE GENTIAN (1, 2, 4)	8	-3	FACW	1-3' (2')	Blue								38	20.0	760.00	0.02	0.02%
HEURIC	*Heuchera richardsonii*	PRAIRIE ALUM ROOT (1, 2)	8	1	FAC-	1-3' (2')	Green								38	15.0	570.00	0.01	0.01%
PENPAL	*Penstemon pallidus*	PALE BEARD TONGUE (5)	6	5	UPL	1-2' (1')	Cream								38	20.0	760.00	0.02	0.02%
PHLDIV	*Phlox divaricata*	WOODLAND PHLOX (1, 2, 5)	5	3	FACU	1-2' (1')	Blue								38	86.0	3,268.00	0.08	0.07%
PHLPIP	*Phlox pilosa*	SAND PRAIRIE PHLOX (2)	7	1	FAC-	1-3' (2')	Pink								38	86.0	3,268.00	0.08	0.07%
POLREP	*Polemonium reptans*	JACOB'S LADDER (2, 3)	5	0	FAC	1-2' (1')	Blue								38	86.0	3,268.00	0.08	0.07%
POLCAL	*Polygonatum canaliculatum*	SMOOTH SOLOMON'S SEAL (3)	3	3	FACU	2-4' (3')	Green								1	100.0	100.00	0.00	0.00%
ROSCAR	*Rosa carolina*	PASTURE ROSE (1, 3)	5	4	FACU-	1-3' (2')	Pink								1	25.0	25.00	0.00	0.00%
ROSSET	*Rosa setigera*	ILLINOIS ROSE (1, 2, 3, 5)	7	2	FACU+	5-8' (6')	Pink								1	15.0	15.00	0.00	0.00%
STISPA	*Stipa spartea*	PORCUPINE GRASS (1, 3)	7	5	UPL	3-5' (4')	N/A								38	43.0	1,634.00	0.04	0.03%
TRIREC	*Trillium recurvatum*	RED TRILLIUM (5)	5	4	FACU-	1-2' (1.5')	Red								1	150.0	150.00	0.00	0.00%
VIOPEL	*Viola pedata linearioloba*	BIRD'S FOOT VIOLET (1, 5)	9	5	UPL	2-6" (3")	Purple								38	86.0	3,268.00	0.08	0.07%
															1106.0	31,298.00	0.72		0.65%

SUPPLIMENTED MIX STATISTICS

Base Seed Mix Including Supplimental Plugs	
Number of Native Species in Mix	58
Native FQI	42.1
Native Mean C Value	5.5
Native Mean W Value	3.4
National Wetland Category	Facultative Upland - Occasionally occurs in wetlands, but usually occur in non-wetlands (estimated 1% - 33% probability)

Some species are not appropriate for inclusion into a seed mix, however they may be very desirable to have as part of the permanent plant matrix because of their ecological, habitat, and/or aesthetic value. The plug species listed above are appropriate for supplementing this seed mix. Following are the common reasons for not including these species within the seed mix: 1-Does not germinate well from seed in the field, 2-

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Wetland Seed Mix (Saturated Soils)

MIX STATISTICS

Base Mix Without Supplimental Plugs

Average Mix Height	3.52'
Median Mix Height	3.00'
Mix Height Mode (# of Occurances in Mix)	3.0' (13), 4.0' (11), 5.0' (9), 2.0' (9), 1.0' (2), 8.0' (1), 7.0' (1), 2.5' (1)
Number of Native Species in Mix	47
Lbs/Acre of ***Native Seed***	7.96
Propagules per Square Foot	317.91
Native FQI	35.4
Native Mean C Value	5.2
Native Mean W Value	-4.2
National Wetland Category	Facultative Wetland (+) - Usually occurs in wetlands, but occasionally found in non-wetlands (estimated 67% - 99% probability). The "+" sign denotes that this mix generally has a greater estimated probability of occurring in wetlands than the "Facultative" general indicator, but a lesser estimated probablity of occurring in wetlands than a mix having the "Facultative Wetalnd" general indicator.

Mix Description: Pizzo's Wetland Seed Mix is designed for consistently saturated soil that does not dry out or areas with shallow standing water (up to 2" of consistent water depth). In addition to the traditional wetland application, this mix is also ideal for use directly adjacent to the water line of pond and stream shorelines where the soil remains saturated and the water level consistently fluctuates 1-2". 69% of the seeds in this mix are Sedge or Sedge-like species. To compliment this dark green aesthetic almost 32% of the mix is composed of wildflowers, which will provide an array of blooms from April through October. This Wetland mix will result in a short-medium profile with over 48% of seeds typically averaging 3.0' high or less at maturity. This mix can be supplemented with the recommended plug list provided below to add diversity, color, and resilience to the long-term health of your wetland.

Grasses, Sedges, & Rushes (Monocots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
CALCAN	*Calamagrostis canadensis*	BLUE JOINT GRASS	3	-5	OBL	3-5' (4')	N/A								280,000	1.0000	0.06	0.78%	2.02%
CXCOMO	*Carex comosa*	BRISTLY SEDGE	5	-5	OBL	1-3' (2')	N/A								30,000	1.0000	0.06	0.78%	0.22%
CXCRIS	*Carex cristatella*	CRESTED OVAL SEDGE	4	-4	FACW+	2-4' (3')	N/A								58,000	0.5000	0.03	0.39%	0.21%
CXFRAN	*Carex frankii*	BRISTLY CATTAIL SEDGE	8	-5	OBL	1-3' (2')	N/A								17,000	2.5000	0.16	1.96%	0.31%
CXHYST	*Carex hystericina*	PORCUPINE SEDGE	5	-5	OBL	2-4' (3')	N/A								30,000	1.5000	0.09	1.18%	0.32%
CXLURI	*Carex lurida*	BOTTLEBRUSH SEDGE	8	-5	OBL	2-4' (3')	N/A								12,000	3.0000	0.19	2.35%	0.26%
CXSCOP	*Carex scoparia*	LANCE-FRUITED OVAL SEDGE	7	-3	FACW	1-3' (2')	N/A								84,000	3.0000	0.19	2.35%	1.82%
CXSTIP	*Carex stipata*	COMMON FOX SEDGE	3	-5	OBL	2-4' (3')	N/A								14,000	1.0000	0.06	0.78%	0.25%
CXVULP	*Carex vulpinoidea*	BROWN FOX SEDGE	2	-5	OBL	2-4' (3')	N/A								100,000	2.0000	0.13	1.57%	1.44%
ELEACI	*Eleocharis acicularis*	NEEDLE SPIKE RUSH	2	-5	OBL	6-12" (8")	N/A								70,000	0.7500	0.05	0.59%	0.38%
ELEERY	*Eleocharis erythropoda*	RED-ROOTED SPIKE RUSH	2	-5	OBL	2-4' (3')	N/A								78000	1.0000	0.06	0.78%	0.56%
LYVIR	*Elymus virginicus*	VIRGINIA WILD RYE	4	-2	FACW-	3-5' (4')	N/A								4,200	32.0000	2.00	25.11%	0.97%
GLYSTR	*Glyceria striata*	FOWL MANNA GRASS	4	-3	[FACW]	2-4' (3')	N/A								90,000	1.0000	0.06	0.78%	0.65%
JUNDUD	*Juncus dudleyi*	DUDLEY'S RUSH	4	0	[FAC]	1-3' (2')	N/A								3,200,000	0.5000	0.03	0.39%	11.55%
JUNEFF	*Juncus effesus*	COMMON RUSH	7	-5	OBL	1-3' (2')	N/A								1,000,000	0.5000	0.03	0.39%	3.61%
JUNTOR	*Juncus torreyi*	TORREY'S RUSH	4	-3	FACW	6" - 18" (12")	N/A								1,600,000	0.5000	0.03	0.39%	5.78%
LEEORY	*Leersia oryzoides*	RICE CUT GRASS	4	-5	OBL	3-5' (4')	N/A								34,000	4.0000	0.25	3.14%	0.98%
SCIATR	*Scirpus atrovirens*	DARK GREEN RUSH	4	-5	OBL	3-6' (5')	N/A								860,000	4.0000	0.25	3.14%	31.29%
SCICYP	*Scirpus cyperinus*	WOOL GRASS	6	-5	OBL	3-5' (4')	N/A								1,700,000	2.0000	0.13	1.57%	24.55%
SPAPEC	*Spartina pectinata*	PRAIRIE CORD GRASS	4	-4	FACW+	5-9' (7')	N/A								6,600	4.0000	0.25	3.14%	0.19%
																Monocot Subtotals		**4.11**	**51.59%**	**69.36%**

Flowers & Other Broadleaves (Dicots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	SEEDS/OZ	OZ/ACRE	LBS/ACRE	% OF MIX by Weight	% OF MIX by Seed Count
ALISUB	*Alisma subcordatum*	COMMON WATER PLANTAIN	4	-5	OBL	1-3' (2')	White								60,000	2.0000	0.13	1.57%	0.87%
ASCINC	*Asclepias incarnata*	SWAMP MILKWEED	4	-5	OBL	3-5' (4')	Magenta								4,800	16.0000	1.00	12.56%	0.55%
ASTNOV	*Aster novae-angliae*	NEW ENGLAND ASTER	4	-3	FACW	4-6' (5')	Purple								65,000	2.5000	0.16	1.96%	1.17%
ASTUMB	*Aster umbellatus*	FLAT-TOP ASTER	9	-3	FACW	3-5' (4')	Cream								67,000	2.0000	0.13	1.57%	0.97%
BOLLAR	*Boltonia latisquama recognita*	FALSE ASTER	9	-5	[OBL]	3-5' (4')	White								160,000	0.7500	0.05	0.59%	0.87%
CASHEB	*Cassia hebecarpa*	WILD SENNA	9	-3	FACW	3-6' (5')	Yellow								1,400	1.0000	0.06	50.00%	1.15%
CHEGLB	*Chelone glabra*	TURTLEHEAD	8	-5	OBL	3-6' (5')	Cream								92,000	1.0000	0.06	0.78%	0.66%
EUPMAM	*Eupatorium maculatum*	SPOTTED JOE PYE WEED	4	-5	OBL	4-7' (5')	Pink								95,000	3.0000	0.19	2.35%	2.06%
EUPPER	*Eupatorium perfoliatum*	COMMON BONESET	4	-4	FACW+	3-6' (4')	White								160,000	1.0000	0.06	0.78%	1.16%
HELAUT	*Helenium autumnale*	SNEEZEWEED	5	-4	FACW+	2-5' (4')	Yellow								110,000	1.0000	0.06	0.78%	0.94%
HIBLAE	*Hibiscus laevis*	HALBERD-LEAVED ROSE MALLOW	6	-5	OBL	3-6' (5')	Pink								2,800	2.0000	0.13	1.57%	0.04%
IMPCAP	*Impatiens capensis*	ORANGE JEWELWEED	3	-3	FACW	2-5' (4')	Orange								4,000	1.0000	0.06	0.78%	0.03%
IRIVIS	*Iris virginica shrevei*	BLUE FLAG	5	-5	OBL	2-4' (3')	Blue								1,000	16.0000	1.00	12.56%	0.12%
LOBSIP	*Lobelia siphilitica*	GREAT BLUE LOBELIA	6	-4	FACW+	2-4' (3')	Blue								500,000	0.5000	0.03	0.39%	1.81%
LYCAME	*Lycopus americanus*	COMMON WATER HOREHOUND	5	-5	OBL	1-3' (2')	White								130,000	0.7500	0.05	0.59%	0.70%
LYTALA	*Lythum alatum*	WINGED LOOSESTRIFE	7	-5	OBL	2-4' (3')	Purple								3,000,000	0.0625	0.00	0.05%	1.35%
MELVIR	*Mekanthium virginicum*	BUNCH FLOWER	10	-4	FACW+	3-6' (5')	White								9,000	1.0000	0.06	0.78%	0.06%
MENARV	*Mentha arvensis villosa*	WILD MINT	5	-5	[OBL]	1-3' (2')	White								300,000	0.3250	0.01	0.10%	0.27%
MIMRIN	*Mimulus ringens*	MONKEY FLOWER	6	-5	OBL	2-4' (2.5')	Purple								2,300,000	0.5000	0.03	0.39%	8.30%
PENSED	*Penthanum sedoides*	DITCH STONECROP	5	-5	OBL	1-3' (2')	Green								1,300,000	0.5000	0.03	0.39%	4.69%
PHYVIV	*Physostegia virginiana*	OBEDIENT PLANT	6	-5	[OBL]	3-5' (4')	Purple								11,000	2.0000	0.13	1.57%	0.16%
SAGLAT	*Sagittaria latifolia*	COMMON ARROWHEAD	4	-5	OBL	2-4' (3')	White								61,000	2.0000	0.13	1.57%	0.88%
SILPER	*Silphium perfoliatum*	CUP PLANT	5	-2	FACW-	5-10' (8')	Yellow								1,400	0.5000	0.03	0.39%	0.01%
SOLGRG	*Solidago graminifolia*	COMMON GRASS-LEAVED GOLDENROD	4	-2	FACW-	2-4' (3')	Yellow								350,000	0.5000	0.03	0.39%	1.26%
SOLRID	*Solidago riddellii*	RIDDELL'S GOLDENROD	7	-5	OBL	2-4' (3')	Yellow								93,000	1.0000	0.06	0.78%	0.67%
VERHAS	*Verbena hastata*	BLUE VERVAIN	4	-4	FACW+	4-7' (5')	Blue								93,000	1.0000	0.06	0.78%	0.67%
VERFAS	*Veronnia fasciculata*	COMMON IRONWEED	5	-3	FACW	4-6' (5')	Purple								24,000	2.0000	0.13	1.57%	0.35%
																Dicot Subtotals		**3.86**	**97.62%**	**31.77%**
																BASE MIX TOTALS		**7.96**	**149.22%**	**101.14%**

Recommended Plug Species to Suppliment Wetland Seed Mix

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	PLUGS/FLAT	FLATS/ ACRE	PLUGS/ ACRE	PLUGS/ SF	% OF MIX by Seed Count
CXLUPN	*Carex lupulina*	COMMON HOP SEDGE (2, 3)	7	-5	OBL	2-4' (3')	N/A								38	20.0	760.00	0.02	0.01%
CXSTRI	*Carex stricta*	COMMON TUSSOCK SEDGE (2, 3)	5	-5	OBL	2-4' (3')	N/A								38	20.0	760.00	0.02	0.01%
CASHEB	*Cassia hebecarpa*	WILD SENNA (2, 3)	9	-3	FACW	3-6' (5')	Yellow								38	15.0	570.00	0.01	0.00%
FILRUB	*Filipendula rubra*	QUEEN OF THE PRAIRIE (1, 2, 5)	10	-5	[OBL]	4-6' (5')	Pink								38	20.0	760.00	0.02	0.01%
GENAND	*Gentiana andrewsii*	BOTTLE GENTIAN (1, 2, 4)	8	-3	FACW	1-3' (2')	Blue								38	15.0	570.00	0.01	0.00%
LIASPI	*Liatris spicata*	MARSH BLAZING STAR (1, 2)	6	0	FAC	3-5' (4')	Purple								38	20.0	760.00	0.02	0.01%
LOBCAR	*Lobelia cardinalis*	CARDINAL FLOWER (1, 2, 4)	7	-5	OBL	3-5' (4')	Red								38	86.0	3,268.00	0.08	0.02%
ONOSEN	*Onoclea sensibilis*	SENSITIVE FERN (5)	8	-3	FACW	1-2' (1.5')	N/A								1	250.0	250.00	0.01	0.00%
PEDLAN	*Pedicularis lanceolata*	FEN BETONY (1, 2, 5)	9	-5	[OBL]	2-4' (3')	Yellow								38	15.0	570.00	0.01	0.00%
PELVIR	*Peltandra virginica*	ARROW ARUM (2, 3)	10	-5	OBL	2-5' (4')	Green								38	86.0	3,268.00	0.08	0.02%
SPAEUR	*Sparganium eurycarpum*	COMMON BUR REED (1)	6	-5	OBL	3-5' (4')	White								38	86.0	3,268.00	0.08	0.02%
SPAELB	*Spiraea alba*	MEADOWSWEET (1, 5)	7	-4	FACW+	3-5' (4')	White								1	25.0	25.00	0.00	0.00%
																618.0	13,309.00	0.31	0.10%

SUPPLIMENTED MIX STATISTICS

Base Seed Mix Including Supplimental Plugs

Number of Native Species in Mix	58
Native FQI	42.8
Native Mean C Value	5.6
Native Mean W Value	-4.2
National Wetland Category	Facultative Wetland (+) - Usually occurs in wetlands, but occasionally found in non-wetlands (estimated 67% - 99%). The "+" sign denotes that this mix generally has a greater estimated probability of occurring in wetlands than the "Facultative" general indicator, but a lesser estimated probablity of occurring in wetlands than a mix having the "Facultative Wetalnd" general indicator.

Some species are not appropriate for inclusion into a seed mix, however they may be very desirable to have as part of the permanent plant matrix because of their ecological, habitat, and/or aesthetic value. The plug species listed above are appropriate for supplementing this seed mix. Following are the common reasons for not including these species within the seed mix: 1-Does not germinate well from seed in the field, 2-Seed is very expensive, 3-Low number of seeds per ounce, 4-Requires specialized microclimate, 5-Seed is not commercially available or is only available in small quantities

Notes:

1.) Pizzo recommends installing a Mycorrhizal Inoculant with the above seed mix at 40 lbs/acre
2.) For spring planting, Pizzo recommends installing a cover crop of Seed Oats (*Avena sativa*) with the above seed mix at 40 lbs/acre
3.) For fall planting, Pizzo recommends installin a cover crop of ReGreen (a Winter Wheat x Wheatgrass Sterile Hybrid) with the above mix at 50 lbs/acre
4.) **At no time should Annual *nor* Perennial Rye (*Lolium multiflorum or perenne*) be utilized as a cover crop**

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Shoreline Plug Mix

Grasses, Sedges, & Rushes (Monocots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	Unit(s)	Size
CXCOMO	*Carex comosa*	BRISTLY SEDGE	5	-5	OBL	1-3' (2')	N/A								each	2" potted
CXEMOR	*Carex emoryi*	RIVERBANK SEDGE	6	-5	OBL	2-4' (3')	N/A								each	2" potted
CXHYST	*Carex hystericina*	PORCUPINE SEDGE	5	-5	OBL	2-4' (3')	N/A								each	2" potted
CXLACU	*Carex lacustris*	COMMON LAKE SEDGE	6	-5	OBL	2-4' (3')	N/A								each	2" potted
CXLUPN	*Carex lupulina*	COMMON HOP SEDGE	7	-5	OBL	2-4' (3')	N/A								each	2" potted
CXLURI	*Carex lurida*	BOTTLEBRUSH SEDGE	8	-5	OBL	2-4' (3')	N/A								each	2" potted
CXSTRI	*Carex stricta*	COMMON TUSSOCK SEDGE	5	-5	OBL	2-4' (3')	N/A								each	2" potted
CXVULP	*Carex vulpinoidea*	BROWN FOX SEDGE	2	-5	OBL	2-4' (3')	N/A								each	2" potted
SCIATR	*Scirpus atrovirens*	DARK GREEN RUSH	4	-5	OBL	3-6' (5')	N/A								each	2" potted
SCICYP	*Scirpus cyperinus*	WOOL GRASS	6	-5	OBL	3-5' (4')	N/A								each	2" potted
SCIVAC	*Scirpus validus creber*	GREAT BULRUSH	5	-5	OBL	4-7' (5.5')	N/A								each	2" potted

Flowers & Other Broadleaves (Dicots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	Unit(s)	Size
ACOCAL	*Acorus calamus*	SWEET FLAG	7	-5	OBL	1-3' (2')	Green								each	2" potted
ALISUB	*Alisma subcordatum*	COMMON WATER PLANTAIN	4	-5	OBL	1-3' (2')	White								each	2" potted
ASCINC	*Asclepias incarnata*	SWAMP MILKWEED	4	-5	OBL	3-5' (4')	Magenta								each	2" potted
EUPMAM	*Eupatorium maculatum*	SPOTTED JOE PYE WEED	4	-5	OBL	4-7' (5')	Pink								each	2" potted
FILRUB	*Filipendula rubra*	QUEEN OF THE PRAIRIE	10	-5	[OBL]	4-6' (5')	Pink								each	2" potted
HIBLAE	*Hibiscus laevis*	HALBERD-LEAVED ROSE MALLOW	6	-5	OBL	3-6' (5')	Pink								each	2" potted
IRIVIS	*Iris virginica shrevei*	BLUE FLAG	5	-5	OBL	2-4' (3')	Blue								each	2" potted
LIASPI	*Liatris spicata*	MARSH BLAZING STAR	6	0	FAC	3-5' (4')	Purple								each	2" potted
LOBCAR	*Lobelia cardinalis*	CARDINAL FLOWER	7	-5	OBL	3-5' (4')	Red								each	2" potted
ONOSEN	*Onoclea sensibilis*	SENSITIVE FERN	8	-3	FACW	1-2' (1.5')	N/A								each	2" potted
PELVIR	*Peltandra virginica*	ARROW ARUM	10	-5	OBL	2-5' (4')	Green								each	2" potted
PONCOR	*Pontederia cordata*	PICKEREL WEED	10	-5	OBL	1-3' (2')	Purple								each	2" potted
SAGLAT	*Sagittaria latifolia*	COMMON ARROWHEAD	4	-5	OBL	2-4' (3')	White								each	2" potted
SOLRID	*Solidago riddellii*	RIDDELL'S GOLDENROD	7	-5	OBL	2-4' (3')	Yellow								each	2" potted
SPAEUR	*Sparganium eurycarpum*	COMMON BUR REED	6	-5	OBL	3-5' (4')	White								each	2" potted

Notes:

1.) **At no time should Annual *nor* Perennial Rye (*Lolium multiflorum or perenne*) be utilized as a cover crop**
2.) **At no time should Creeping Bent Grass (*Agrostis palustris*) be utilized as a cover crop**

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Submergent Plug Mix

Flowers & Other Broadleaves (Dicots)

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	COLOR	BLOOM TIME A	M	J	J	A	S	O	Unit(s)	Size
NUPADV	*Nuphar advena*	YELLOW POND LILY	7	-5	OBL	floating	Yellow								each	bare root
NYMTUB	*Nymphaea tuberosa*	WHITE WATER LILY	7	-5	OBL	floating	White								each	bare root
POTNOD	*Potamogeton nodosus*	LONG-LEAVED PONDWEED	7	-5	OBL	3-5' (4')	N/A								each	bare root

Notes:

1.) Pizzo recommends installing a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre
2.) For spring planting, Pizzo recommends installing a cover crop of Seed Oats (*Avena sativa*) with the above seed mix at 40 lbs/acre
3.) For fall planting, Pizzo recommends installin a cover crop of ReGreen (a Winter Wheat x Wheatgrass Sterile Hybrid) with the above mix at 50 lbs/acre
4.) **At no time should Annual *nor* Perennial Rye (*Lolium multiflorum or perenne*) be utilized as a cover crop**

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Landscape Plants

Trees - Canopy

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	FALL COLOR	Unit(s)	Size	Notes
ACESAC	*Acer saccharum*	SUGAR MAPLE	3	3	FACU	60-75' (65')	N/A								Yellow-Orange	each	15 Gallon	
ACESAG	*Acer saccharum 'Green Mountain'*	GREEN MOUNTAIN SUGAR MAPLE	5	3	FACU	60-75' (70')	N/A								Yellow-Orange	each	2.5" Caliper	
CAROVT	*Carya ovata*	SHAGBARK HICKORY	5	3	FACU	60-80' (70')	N/A								Yellow	each	3 Gallon	
NYSSYL	*Nyssa sylvatica*	BLACK TUPELO	8	0	[FAC]	30-50' (45')	N/A								Red-Orange	each	15 Gallon	
QUEALB	*Quercus alba*	WHITE OAK	5	0	FAC	50-80' (70')	N/A								Red	each	15 Gallon	
QUERUB-15	*Quercus rubra*	RED OAK	7	3	FACU	60-75' (70')	N/A								Red	each	15 Gallon	
QUERUB	*Quercus rubra*	RED OAK	7	3	FACU	60-75' (70')	N/A								Red	each	2.5" Caliper	

Trees - Ornamental

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	FALL COLOR	Unit(s)	Size	Notes
AMEGRP	*Amelanchier x grandiflora 'Princess Diana'*	PRINCESS DIANA SERVICEBERRY	8	4	FUPL	15-25' (20')	White								Red	each	4' High (Clump)	
CERCAN	*Cercis canadensis*	EASTERN REDBUD	10	3	FACU	20-30' (25')	Purple								Yellow-Green	each	5 Gallon	
CERCAF	*Cercis canadensis 'Forest Pansy'*	FOREST PANSY EASTERN REDBUD	10	3	FACU	20-30' (25')	Purple								Yellow-Green	each	4' High (Clump)	
CORFLO	*Cornus florida*	FLOWERING DOGWOOD	8	4	FACU-	15-30' (20')	Pink								Red-Purple	each	15 Gallon	
CRACRI	*Crataegus crus-galli var. inermis*	THORNLESS COCKSPUR HAWTHORN	2	0	FAC	15-30' (20')	White								Red-Purple	each	4' High (Clump)	
HAMVIR	*Hamamelis virginiana*	COMMON WITCH HAZEL	8	3	FACU	15-30' (20')	Yellow								Yellow	each	4' High (Clump)	
MALIOE	*Malus ioensis 'Prairie Rose'*	PRAIRIE ROSE CRABAPPLE	3	5	UPL	15-30' (20')	Pink								Yellow-Green	each	2.5" Caliper	

Shrubs

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	FALL COLOR	Unit(s)	Size	Notes
CORAME	*Corylus americana*	AMERICAN HAZELNUT	5	4	FACU-	8-15' (10')	N/A								Red-Purple	each	3 Gallon	
HYDARI	*Hydrangea arborescens 'Invincible Spirit'*	INVINCIBLE SPIRIT SMOOTH HYDRANGEA	10	4	FACU-	3-5' (4.5')	Pink								Yellow-Green	each	3 Gallon	Prune spent flowers to promote continued flowering
ILEVES	*Ilex verticillata 'Southern Gentelman'*	MALE WINTERBERRY	9	-4	FACW+	6-10' (8')	N/A								Red	each	4' High	Male required for berry production
ILEVSW	*Ilex verticillata 'Winter Red'*	FEMALE WINTERBERRY	9	-4	FACW+	6-10' (8')	White								Red	each	4' High	Prolific bright red berries persist in winter
LINBEN	*Lindera benzoin*	SPICEBUSH	7	-2	FACW-	6-12' (10)	Yellow								Yellow	each	5 Gallon	
RHUARO	*Rhus aromatica*	FRANGRANT SUMAC	10	5	UPL	2-6' (5')	N/A								Red-Orange	each	3 Gallon	
RHUARG	*Rhus aromatica 'Gro-Low'*	GRO-LOW FRAGRANT SUMAC	10	5	UPL	2-3' (2.5')	N/A								Red-Orange	each	3 Gallon	
RHUGLA	*Rhus glabra*	SMOOTH SUMAC	1	5	UPL	10-15' (12')	N/A								Red	each	5 Gallon	
VIBPRU	*Viburnum prunifolium*	BLACKHAW VIBURNUM	5	3	FACU	10-15' (12')	White								Red-Maroon	each	4' High (Clump)	

Perennials

ACRONYM	SCIENTIFIC NAME	COMMON NAME	C-Value	W-Value	WETNESS	HEIGHT Min-Max (Typical)	BLOOM COLOR	BLOOM TIME A	M	J	J	A	S	O	FALL COLOR	Unit(s)	Size	Notes
ALLCER	*Allium cernuum*	NODDING WILD ONION	7	1	[FAC-]	1-3' (1.5')	Pink								N/A	each	3" potted	9" o.c. spacing
ANDSCO	*Andropogon scoparius*	LITTLE BLUESTEM GRASS	5	4	FACU-	2-3' (3')	N/A								Purple-Bronze	each	2" potted	18" o.c. spacing
ANECAN	*Anemone canadensis*	MEADOW ANEMONE	4	-3	FACW	1-2' (1.5')	White								N/A	each	2" potted	9" o.c. spacing
ASACAN-Q	*Asarum canadense*	WILD GINGER	7	5	UPL	to 8"	Red								N/A	each	1 Quart	12" o.c. spacing
ASTAZU	*Aster azureus*	SKY-BLUE ASTER	8	5	UPL	2-5' (3')	Blue								N/A	each	2" potted	12" o.c. spacing
ASTMAC	*Aster macrophyllus*	BIG-LEAVED ASTER	8	5	UPL	1-2' (1')	White								N/A	each	2" potted	12" o.c. spacing
ASTNOP-Q	*Aster novae-angliae 'Purple Dome'*	PURPLE DOME NEW ENGLAND ASTER	4	-3	FACW	1.5-3' (2')	Purple								N/A	each	1 Quart	18" o.c. spacing
CAJAMZ	*Carex jamesii*	GRASS SEDGE	5	5	UPL	1-2' (1.5')	N/A								Green-Tan	each	2" potted	12" o.c. spacing
DESCAM-Q	*Deschampsia caespitosa*	TUFTED HAIR GRASS	10	-5	OBL	1.3-3' (2')	N/A								Green-Tan	each	1 Quart	36" o.c. spacing
DODMEA	*Dodecatheon meadia*	SHOOTING STAR	6	3	FACU	1-2' (1.5')	White								N/A	each	2" potted	12" o.c. mix w/ALLCER, ANDSCO, ANECAN, & RUDSPV
ECHPAL	*Echinacea pallida*	PALE PURPLE CONEFLOWER	8	5	UPL	2-4' (3')	Pink								N/A	each	2" potted	24-36" o.c., mix w/ECHPUM
ECHPUR	*Echinacea purpurea*	PURPLE CONEFLOWER	3	5	UPL	2-5' (4')	Purple								N/A	each	2" potted	18" o.c. spacing
ECHPUM-Q	*Echinacea purpurea 'Magnus'*	MAGNUS PURPLE CONEFLOWER	3	5	UPL	2-4' (3')	Purple								N/A	each	1 Quart	24" o.c. spacing
GERMAC-Q	*Geranium maculatum*	WILD GERANIUM	4	5	[UPL]	1-3' (2')	Purple								N/A	each	1 Quart	18" o.c. spacing
LIASCN-Q	*Liatris scariosa nieuwlandii*	SAVANNA BLAZING STAR	5	5	[UPL]	2.5-5' (3.5')	Purple								N/A	each	1 Quart	12" o.c. spacing
LIASPK-Q	*Liatris spicata 'Kobold'*	KOBALD MARSH BLAZING STAR	6	0	FAC	1-3' (2')	Purple								N/A	each	1 Quart	18" o.c. spacing
PANVIR	*Panicum virgatum*	SWITCH GRASS	5	-1	FAC+	3-5' (4')	N/A								N/A	each	2" potted	24" o.c. spacing
PANVIS-G	*Panicum virgatum 'Shenandoah'*	SHENANDOAH SWITCH GRASS	5	-1	FAC+	3-4' (3.5')	N/A								N/A	each	1 Gallon	24" o.c. spacing
PENDIG-Q	*Penstemon digitalis*	FOXGLOVE BEARD TONGUE	4	1	FAC-	2.5-5' (3.5')	White								N/A	each	1 Quart	18" o.c. spacing
PHLDIV	*Phlox divaricata*	WOODLAND PHLOX	5	3	FACU	1-2' (1')	Blue								N/A	each	2" potted	12" o.c. spacing
POLREP-Q	*Polemonium reptans*	JACOB'S LADDER	5	0	FAC	1-2' (1')	Blue								N/A	each	1 Quart	12" o.c. spacing
RUDSPF	*Rudbeckia speciosa var. fulgida*	SHOWY BLACK-EYED SUSAN	8	-5	[FACW]	2-4' (3')	Yellow								N/A	each	2" potted	18-24" o.c. spacing
RUDSPV-Q	*Rudbeckia speciosa var. fulgida 'Viette's Little Suzy'*	VIETTE'S DWARF BLACK-EYED SUSAN	8	-3	[FACW]	1-2' (1.3')	Yellow								N/A	each	1 Quart	18" o.c. spacing
SOLCAE	*Solidago caesia*	BLUE-STEMMED GOLDENROD	7	3	FACU	1-3' (2')	Yellow								N/A	each	2" potted	12" o.c. spacing
SOLCAC-Q	*Solidago canadensis 'Crown of Rays'*	CROWN OF RAYS GOLDENROD	1	3	FACU	2-4' (3')	N/A								N/A	each	1 Quart	18" o.c. spacing
SOLFLE	*Solidago flexicaulis*	BROAD-LEAVED GOLDENROD	7	3	FACU	2-4' (3')	Yellow								N/A	each	2" potted	12" o.c. spacing
SOLSPE	*Solidago speciosa*	SHOWY GOLDENROD	7	5	UPL	3-6' (5')	Yellow								N/A	each	2" potted	18" o.c. spacing
SPOHET	*Sporobolus heterolepis*	PRAIRIE DROPSEED	10	4	FACU-	1-2.5' (2')	N/A								Tan	each	2" potted	24" o.c. spacing
SPOHTA-Q	*Sporobolus heterolepis 'Tara'*	TARA DWARF PRAIRIE DROPSEED	10	4	FACU-	1-2' (1.5')	N/A								Tan	each	1 Quart	18" o.c. spacing

Notes:

1.) Pizzo recommends installing a Mycorrhizal Inocculant with the above seed mix at 40 lbs/acre

2.) Prepare soil seedbed the same as for traditional turf seeding

3.) Apply starter fertilizer the same as for traditional turf seeding

4.) Because of the seeding timeframe, temporary irrigation should be provided until establishment

5.) **At no time should Annual per, Perennial Rye (Lolium multiflorum, or perenne) be utilized as a cover crop**

NATIVE TREE SPECIES

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOGNOMY	COMMON NAME
ACESAU	3	Acer saccharum	3	FACU	Nt Tree	SUGAR MAPLE
AESGLA	3	Aesculus glabra	3	FACU	Nt Tree	OHIO BUCKEYE
AMEARB	8	Amelanchier arborea	3	FACU	Nt Tree	SERVICEBERRY
AMELAE	8	Amelanchier laevis	5	UPL	Nt Tree	ALLEGHENY SHADBLOW*
CARCAV	8	Carpinus caroliniana virginiana	0	FAC	Nt Tree	BLUE BEECH
CARCOR	7	Carya cordiformis	3	FACU	Nt Tree	BITTERNUT HICKORY**
CAROVT	5	Carya ovata	3	FACU	Nt Tree	SHAGBARK HICKORY**
CELOCC	3	Celtis occidentalis	1	FAC-	Nt Tree	HACKBERRY
CERCAN	10	Cercis canadensis	3	FACU	Nt Tree	REDBUD
CORALT	9	Cornus alternifolia	1	[FAC-]	Nt Tree	PAGODA DOGWOOD
CRACRU	2	Crataegus crus-galli	0	FAC	Nt Tree	COCKSPUR HAWTHORN
GLETRI	2	Gleditsia triacanthos	0	FAC	Nt Tree	HONEY LOCUST
GYMDIO	8	Gymnocladus dioica	5	UPL	Nt Tree	KENTUCKY COFFEE TREE
JUGNIG	5	Juglans nigra	3	FACU	Nt Tree	BLACK WALNUT
JUNVIC	2	Juniperus virginiana crebra	3	FACU	Nt Tree	RED CEDAR
MALIOE	3	Malus ioensis	5	UPL	Nt Tree	IOWA CRAB
NYSSYL	8	Nyssa sylvatica	0	FAC	Nt Tree	BLACK GUM
OSTVIR	5	Ostrya virginiana	4	FACU-	Nt Tree	HOP HORNBEAM
PINSTR	9	Pinus strobus	3	FACU	Nt Tree	WHITE PINE
PLAOCC	9	Platanus occidentalis	-3	FACW	Nt Tree	SYCAMORE
PRUAME	5	Prunus americana	5	UPL	Nt Tree	WILD PLUM
QUEALB	5	Quercus alba	0	FAC	Nt Tree	WHITE OAK
QUEBIC	6	Quercus bicolor	-4	FACW+	Nt Tree	SWAMP WHITE OAK
QUEIMB	7	Quercus imbricaria	1	FAC-	Nt Tree	SHINGLE OAK
QUEMAC	5	Quercus macrocarpa	1	FAC-	Nt Tree	BUR OAK
QUEMUH	8	Quercus muhlenbergii	5	UPL	Nt Tree	CHINQUAPIN OAK
QUEPAU	8	Quercus palustris	-3	FACW	Nt Tree	PIN OAK
QUERUB	7	Quercus rubra	3	FACU	Nt Tree	RED OAK
QUEVEL	6	Quercus velutina	5	UPL	Nt Tree	BLACK OAK
SASALB	3	Sassafras albidum	3	FACU	Nt Tree	SASSAFRAS
THUOCC	10	Thuja occidentalis	-3	FACW	Nt Tree	EASTERN WHITE CEDAR*
TILAME	5	Tilia americana	3	FACU	Nt Tree	AMERICAN LINDEN

*Not known to be native specifically to Kankakee County, however native in adjacent counties.
**Difficult to find commercially

NATIVE SHRUB SPECIES

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOGNOMY	COMMON NAME
AMOCAN	9	Amorpha canescens	5	UPL	Nt Shrub	LEAD PLANT
AMOFRU	6	Amorpha fruticosa	-4	FACW+	Nt Shrub	INDIGO BUSH
AROPRU	6	Aronia arbutifolia	-2	FACW-	Nt Shrub	RED CHOKEBERRY
AROPRU	6	Aronia melanocarpa	-2	FACW-	Nt Shrub	BLACK CHOKEBERRY
AROPRU	6	Aronia prunifolia	-2	FACW-	Nt Shrub	CHOKEBERRY
CEAAME	6	Ceanothus americanus	5	UPL	Nt Shrub	NEW JERSEY TEA
CEPOCC	5	Cephalanthus occidentalis	-5	OBL	Nt Shrub	BUTTONBUSH
COROBL	6	Cornus obliqua	-4	FACW+	Nt Shrub	BLUE-FRUITED DOGWOOD
CORAME	5	Corylus americana	4	FACU-	Nt Shrub	AMERICAN HAZELNUT
CORSTO	6	Cornus stolonifera	-3	FACW	Nt Shrub	RED-OSIER DOGWOOD
DIELON	9	Diervilla lonicera	5	UPL	Nt Shrub	DWARF HONEYSUCKLE
HAMVIR	8	Hamamelis virginiana	3	FACU	Nt Shrub	WITCH HAZEL
HYDARB	10	Hydrangea arborescens	4	FACU-	Nt Shrub	WILD HYDRANGEA*
HYPKAL	10	Hypericum kalmianum	-2	FACW-	Nt Shrub	KALM'S ST. JOHN'S WORT*
JUNCON	10	Juniperus communis	5	UPL	Nt Shrub	COMMON JUNIPER*
JUNHOR	10	Juniperus horizontalis	5	UPL	Nt Shrub	TRAILING JUNIPER*
PHYOPU	8	Physocarpus opulifolius	-2	FACW-	Nt Shrub	NINEBARK
PTETRT	7	Ptelea trifoliata	2	FACU+	Nt Shrub	WAFER ASH
RHUARM	10	Rhus aromatica	5	UPL	Nt Shrub	FRAGRANT SUMAC
RHUCOL	6	Rhus copallina latifolia	5	UPL	Nt Shrub	SHINING SUMAC
RHUTYP	1	Rhus typhina	5	UPL	Nt Tree	STAGHORN SUMAC
RHUGLA	1	Rhus glabra	5	UPL	Nt Shrub	SMOOTH SUMAC
ROSBLA	5	Rosa blanda	3	FACU	Nt Shrub	EARLY WILD ROSE
ROSCAR	5	Rosa carolina	4	FACU-	Nt Shrub	PASTURE ROSE
ROSPAL	7	Rosa palustris	-5	OBL	Nt Shrub	SWAMP ROSE
SPIALB	7	Spiraea alba	-4	FACW+	Nt Shrub	MEADOWSWEET
SPITOR	9	Spiraea tomentosa rosea	-3	FACW	Nt Shrub	STEEPLE BUSH
STATRI	7	Staphylea trifolia	0	FAC	Nt Shrub	BLADDERNUT
SYMALA	10	Symphoricarpos albus	5	UPL	Nt Shrub	SNOWBERRY*
VIBLEN	5	Viburnum lentago	-1	FAC+	Nt Shrub	NANNYBERRY
VIBPRU	5	Viburnum prunifolium	3	FACU	Nt Shrub	BLACK HAW

*Not known to be native specifically to Kankakee County, however native in adjacent counties

DO NOT PLANT THE FOLLOWING SPECIES!

TREES

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOGNOMY	COMMON NAME
ACEPLA	nn	ACER PLATANOIDES	5	UPL	Ad Tree	NORWAY MAPLE*
AILALT	nn	AILANTHUS ALTISSIMA	5	UPL	Ad Tree	TREE OF HEAVEN*
ALNGLU	nn	ALNUS GLUTINOSA	-2	FACW-	Ad Tree	EUROPEAN ALDER*
CATSPE	nn	CATALPA SPECIOSA	3	FACU	Ad Tree	HARDY CATALPA
FRAAMB	9	Fraxinus americana	-3	FACW	Nt Tree	WHITE ASH (Ash Borer)
FRAQUA	8	Fraxinus quadrangulata	5	UPL	Nt Tree	BLUE ASH (Ash Borer)
MORALB	nn	MORUS ALBA	0	FAC	Ad Tree	WHITE MULBERRY*
PINNIG	nn	PINUS NIGRA	5	UPL	Ad Tree	AUSTRIAN PINE
PINSYL	nn	PINUS SYLVESTRIS	5	UPL	Ad Tree	SCOTCH PINE
POPALB	nn	POPULUS ALBA	5	UPL	Ad Tree	WHITE POPLAR*
POPCAN	nn	POPULUS CANESCENS	5	UPL	Ad Tree	GRAY POPLAR*
POPNII	nn	POPULUS NIGRA ITALICA	5	UPL	Ad Tree	LOMBARDY POPLAR*
PRUAVI	nn	PRUNUS AVIUM	5	UPL	Ad Tree	SWEET CHERRY
PRUCER	nn	PRUNUS CERASUS	5	UPL	Ad Tree	SOUR CHERRY
PRUDOM	nn	PRUNUS DOMESTICA	5	UPL	Ad Tree	GARDEN PLUM
PRUHOR	nn	PRUNUS HORTULANA	5	UPL	Ad Tree	WILD GOOSE PLUM
PRUMAH	nn	PRUNUS MAHALEB	5	UPL	Ad Tree	PERFUMED CHERRY
PRUPAD	nn	PRUNUS PADUS	5	UPL	Ad Tree	EUROPEAN BIRD CHERRY
PRUPER	nn	PRUNUS PERSICA	5	UPL	Ad Tree	PEACH
PRUTOM	nn	PRUNUS TOMENTOSA	5	UPL	Ad Tree	NANKING CHERRY
PYRCAL	nn	PYRUS CALLERYANA	5	UPL	Ad Tree	ORNAMENTAL PEAR
PYRCOM	nn	PYRUS COMMUNIS	5	UPL	Ad Tree	PEAR
ROBPSE	nn	ROBINIA PSEUDOACACIA	4	FACU-	Ad Tree	BLACK LOCUST*
ROBVIS	nn	ROBINIA VISCOSA	5	UPL	Ad Tree	CLAMMY LOCUST
SALALB	nn	SALIX ALBA	-3	FACW	Ad Tree	WHITE WILLOW
SALBAB	nn	SALIX BABYLONICA	-3	FACW	Ad Tree	WEEPING WILLOW
SALFRA	nn	SALIX FRAGILIS	-1	FAC+	Ad Tree	CRACK WILLOW
SALPEN	nn	SALIX PENTANDRA	5	UPL	Ad Tree	BAY-LEAVED WILLOW
SALRUB	nn	SALIX X RUBENS	-4	FACW+	Ad Tree	HYBRID CRACK WILLOW
ULMPUM	nn	ULMUS PUMILA	5	UPL	Ad Tree	SIBERIAN ELM*

SHRUBS

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOGNOMY	COMMON NAME
BERTHU	nn	BERBERIS THUNBERGII	4	FACU-	Ad Shrub	JAPANESE BARBERRY*
BERVUL	nn	BERBERIS VULGARIS	3	FACU	Ad Shrub	EUROPEAN BARBERRY*
COTCOG	nn	COTINUS COGGYGRIA	5	UPL	Ad Shrub	EUROPEAN SMOKE TREE
COTACU	nn	COTONEASTER ACUTIFOLIA	5	UPL	Ad Shrub	PEKING COTONEASTER
COTMUL	nn	COTONEASTER MULTIFLORA	5	UPL	Ad Shrub	MANY-FLOWERED COTONEASTER
ELAANG	nn	ELAEAGNUS ANGUSTIFOLIA	4	FACU-	Ad Shrub	RUSSIAN OLIVE*
ELAUMB	nn	ELAEAGNUS UMBELLATA	5	UPL	Ad Shrub	AUTUMN OLIVE*
EUOALA	nn	EUONYMUS ALATUS	5	UPL	Ad Shrub	BURNING BUSH*
EUOBUN	nn	EUONYMUS BUNGEANUS	5	UPL	Ad Shrub	CHINESE SPINDLE TREE
EUOEUR	nn	EUONYMUS EUROPAEUS	5	UPL	Ad Shrub	EUROPEAN SPINDLE TREE
EUOFOR	nn	EUONYMUS FORTUNEI	5	UPL	Ad Shrub	WINTERCREEPER*
EUOHAM	nn	EUONYMUS HAMILTONIANUS	5	UPL	Ad Shrub	JAPANESE SPINDLE TREE
FORINT	nn	FORSYTHIA X INTERMEDIA	5	UPL	Ad Shrub	GOLDEN BELL
LONMAA	nn	LONICERA MAACKII	5	UPL	Ad Shrub	AMUR HONEYSUCKLE*
LONMOR	nn	LONICERA MORROWII	5	UPL	Ad Shrub	MORROW'S HONEYSUCKLE*
LONRUP	nn	LONICERA RUPRECHTIANA	5	UPL	Ad Shrub	MANCHURIAN HONEYSUCKLE*
LONTAT	nn	LONICERA TATARICA	5	[UPL]	Ad Shrub	TARTARIAN HONEYSUCKLE*
LONBEL	nn	LONICERA X BELLA	4	FACU-	Ad Shrub	SHOWY FLY HONEYSUCKLE*
LONHEC	nn	LONICERA X HECKROTTII	5	UPL	Ad Shrub	GOLD FLAME HONEYSUCKLE*
LONMIN	nn	LONICERA X MINUTIFLORA	5	UPL	Ad Shrub	LONICERA X MINUTIFLORA*
LONMUE	nn	LONICERA X MUENDENIENSIS	5	UPL	Ad Shrub	COMMON FLY HONEYSUCKLE*
LONMUS	nn	LONICERA X MUSCAVIENSIS	5	UPL	Ad Shrub	LONICERA X MUSCAVIENSIS*
LONNOT	nn	LONICERA X NOTHA	5	UPL	Ad Shrub	LONICERA X NOTHA*
LONXYS	nn	LONICERA X XYLOSTEOIDES	5	UPL	Ad Shrub	LONICERA X XYLOSTEOIDES*
LONXYM	nn	LONICERA XYLOSTEUM	5	UPL	Ad Shrub	EUROPEAN FLY HONEYSUCKLE*

PRUANG	nn	PRUNUS ANGUSTIFOLIA	5	UPL	Ad Shrub	CHICKASAW PLUM
RHAARV	nn	RHAMNUS ARGUTA VELUTINA	5	UPL	Ad Shrub	SAW-TOOTHED BUCKTHORN*
RHACAT	nn	RHAMNUS CATHARTICA	3	FACU	Ad Shrub	COMMON BUCKTHORN*
RHADAV	nn	RHAMNUS DAVURICA	5	UPL	Ad Shrub	DAHURIAN BUCKTHORN*
RHAFRA	nn	RHAMNUS FRANGULA	-1	FAC+	Ad Shrub	GLOSSY BUCKTHORN*
RHAJAP	nn	RHAMNUS JAPONICA	5	UPL	Ad Shrub	JAPANESE BUCKTHORN*
RHAUTI	nn	RHAMNUS UTILIS	5	UPL	Ad Shrub	CHINESE BUCKTHORN*
RIBNIG	nn	RIBES NIGRUM	5	UPL	Ad Shrub	BLACK CURRANT
RIBODO	nn	RIBES ODORATUM	1	FAC-	Ad Shrub	GOLDEN CURRANT
RIBSAT	nn	RIBES SATIVUM	5	UPL	Ad Shrub	RED CURRANT
ROBHIH	nn	ROBINIA HISPIDA	5	UPL	Ad Shrub	BRISTLY LOCUST
ROBHIF	nn	ROBINIA HISPIDA FERTILIS	5	[UPL]	Ad Shrub	FRUITING BRISTLY LOCUST
ROBLUX	nn	ROBINIA LUXURIANS	5	UPL	Ad Shrub	ROCKY MOUNTAIN LOCUST
ROSMUL	nn	ROSA MULTIFLORA	3	FACU	Ad Shrub	MULTIFLORA ROSE*
RUBIDI	nn	RUBUS IDAEUS	2	FACU+	Ad Shrub	GARDEN RASPBERRY
RUBLAC	nn	RUBUS LACINIATUS	5	UPL	Ad Shrub	EVERGREEN BLACKBERRY
RUBPHO	nn	RUBUS PHOENICOLASIUS	5	UPL	Ad Shrub	WINEBERRY
SALCAP	nn	SALIX CAPREA	5	UPL	Ad Shrub	GOAT WILLOW
SALCIN	nn	SALIX CINEREA	5	UPL	Ad Shrub	GRAY WILLOW
SALPUR	nn	SALIX PURPUREA	-4	FACW+	Ad Shrub	PURPLE WILLOW
SYRVUL	nn	SYRINGA VULGARIS	5	UPL	Ad Shrub	LILAC
VIBDEN	nn	VIBURNUM DENTATUM	5	UPL	Ad Shrub	ARROW-WOOD
VIBLAN	nn	VIBURNUM LANTANA	5	UPL	Ad Shrub	WAYFARING TREE
VIBOPU	nn	VIBURNUM OPULUS	3	[FACU]	Ad Shrub	EUROPEAN HIGHBUSH CRANBERRY
VIBREC	nn	VIBURNUM RECOGNITUM	-2	FACW-	Ad Shrub	SMOOTH ARROW-WOOD
VINMIN	nn	VINCA MINOR	5	UPL	Ad Shrub	PERIWINKLE
YUCSMA	nn	YUCCA SMALLIANA	5	UPL	Ad Shrub	ADAM'S NEEDLE

VINES

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOGNOMY	COMMON NAME
CAMRAD	nn	CAMPSIS RADICANS	0	FAC	Ad W-Vine	TRUMPET CREEPER*
CELORB	nn	CELASTRUS ORBICULATUS	5	UPL	Ad W-Vine	ORIENTAL BITTERSWEET*
HEDHEL	nn	HEDRA HELIX	3	FACU	Ad W-Vine	ENGLISH IVY*
LONJAP	nn	LONICERA JAPONICA	3	FACU	Ad W-Vine	JAPANESE HONEYSUCKLE*
WISMAC	nn	WISTERIA MACROSTACHYA	5	[UPL]	Ad W-Vine	KENTUCKY WISTERIA*

GRASSES

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOGNOMY	COMMON NAME
BROINE	nn	BROMUS INERMIS	5	UPL	Ad P-Grass	HUNGARIAN BROME*
BROTEC	nn	BROMUS TECTORUM	5	UPL	Ad A-Grass	DOWNY BROME*
GLYRMX	nn	GLYCERIA MAXIMA	-5	OBL	Ad P-Grass	TALL MANNA GRASS
MISSAC	nn	MISCANTHUS SACCHARIFLORUS	5	UPL	Ad P-Grass	SILVER GRASS*
MISSIZ	nn	MISCANTHUS SINENSIS ZEBRINUS	5	UPL	Ad P-Grass	EULALIA*
PHAARU	nn	PHALARIS ARUNDINACEA	-4	FACW+	Ad P-Grass	REED CANARY GRASS*
PHACAN	nn	PHALARIS CANARIENSIS	3	FACU	Ad A-Grass	CANARY GRASS*
PHRAUS	1	Phragmites australis	-4	FACW+	Nt P-Grass	COMMON REED*

PERENNIALS

ACRONYM	C	SCIENTIFIC NAME	W	WETNESS	PHYSIOGNOMY	COMMON NAME
ALLPET	nn	ALLIARIA PETIOLATA	0	FAC	Ad B-Forb	GARLIC MUSTARD*
CENMAC	nn	CENTAUREA MACULOSA	5	UPL	Ad B-Forb	SPOTTED KNAPWEED*
CIRARV	nn	CIRSIUM ARVENSE	5	UPL	Ad P-Forb	FIELD THISTLE*
CIRVUL	nn	CIRSIUM VULGARE	4	FACU-	Ad B-Forb	BULL THISTLE*
DAUCAR	nn	DAUCUS CAROTA	5	UPL	Ad B-Forb	QUEEN ANNE'S LACE*
DIPLAC	nn	DIPSACUS LACINIATUS	5	UPL	Ad B-Forb	CUT-LEAVED TEASEL*
DIPSYL	nn	DIPSACUS SYLVESTRIS	5	UPL	Ad B-Forb	COMMON TEASEL*
HESMAT	nn	HESPERIS MATRONALIS	5	UPL	Ad P-Forb	DAME'S ROCKET*
LYTSAL	nn	LYTHRUM SALICARIA	-5	OBL	Ad P-Forb	PURPLE LOOSESTRIFE*
MELALB	nn	MELILOTUS ALBA	3	FACU	Ad B-Forb	WHITE SWEET CLOVER*
MELLOF	nn	MELILOTUS OFFICINALIS	3	FACU	Ad B-Forb	YELLOW SWEET CLOVER*
PASSAT	nn	PASTINACA SATIVA	5	UPL	Ad B-Forb	WILD PARSNIP*
SOLSEM	nn	SOLIDAGO SEMPERVIRENS	3	[FACU]	Ad P-Forb	SEASIDE GOLDENROD*
TYPANG	1	Typha angustifolia	-5	OBL	Nt P-Forb	NARROW-LEAVED CATTAIL*
TYPLAT	1	Typha latifolia	-5	OBL	Nt P-Forb	BROAD-LEAVED CATTAIL*
TYPGLA	1	Typha X glauca	-5	OBL	Nt P-Forb	HYBRID CATTAIL*

*Very Invasive Species

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